ABSTRACT
        Those who plan to develop protocol materials will
benefit from the efforts that have been put forth by others when they
use this book. This handbook provides a record of some of the events
that have taken place in the training of personnel in the production
of materials, the problems encountered and the solutions attempted, a
collection of documents that have been developed by project
directors, the Leadership Training Institute, and others whose
expertise has been sought to give assistance to the program. The
handbook is arranged into six major sections, in addition to an
overview. The first section provides an introduction to protocol and
training materials. The next section raises questions and supplies
some answers in the problems of working with concepts in the training
of teachers. The third section, comprised of five papers, deals with
the development of protocol materials including information on the
master plan, teacher education, concepts, cues and miscues, and
progressive evaluation. The last section focuses on establishing
criteria for selecting protocol materials for distribution. (SJM)

Handbook on the Development and Use of Protocol Materials for Teacher Education
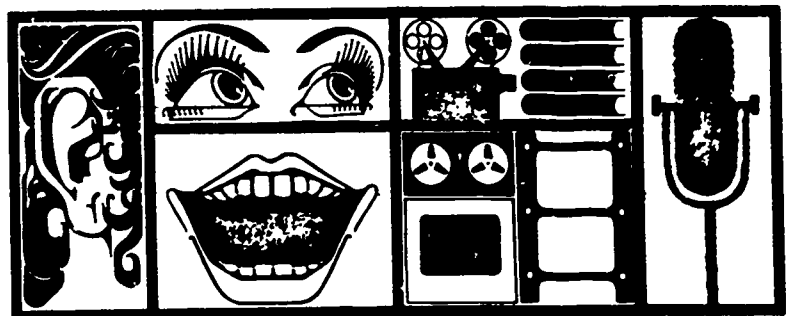
LEADERSHIP TRAINING INSTITUTE

R. Othanel Smith, Director
Donald E. Orlosky, Associate Director

University of South Florida

James A. Banks
    University of Washington

James M. Cooper
    University of Houston

William Drummond
    University of Florida

Ned Flanders
    Far West Laboratory

Vernon Haubrich
    University of Wisconsin

Charles Modiste
    San Mateo, California
    Public Schools

Irving Morrissett
    University of Colorado

Alan Purves
    University of Illinois

Frederick Rodgers
    University of Illinois

Benjamin Rosner
    City University of New York

H. Del Schalock
    Teaching Research Division
    Oregon State System of Higher
    Education

Charles Schuller
    Michigan State University

Charles Scruggs
    State University of New York
    at Geneseo

Roger Shuy
    Georgetown University

Richard L. Turner
    Indiana University

HANDBOOK ON THE DEVELOPMENT AND USE OF

PROTOCOL MATERIALS FOR TEACHER EDUCATION

Edited by

B. Othanel Smith
Donald E. Orlosky
Jean Borg

University of South Florida

Printed and Distributed by

Panhandle Area Educational Cooperative

P.O. Drawer 190

Chipley, Florida 32428

1973

The material in this handbook was developed under the direction of the Leadership Training Institute on Teacher Centers funded by the United States Office of Education - National Center for the Improvement of Educational Systems under Grant # OEG 0-71-1079 (725)

CONTENTS

OVERVIEW OF THE PROTOCOL MATERIALS PROGRAM

In any significant area of endeavor only a few of many ideas perceived are ever seriously attempted. Of those attempted, some turn out to be successful and others are found to be lacking. In the field of teacher training the idea of protocol materials has been perceived and a serious attempt has been made to produce these materials. However, it is too early to determine if the use of protocol materials in teacher training will be successful and make a noticeable impact on improving the performance of teachers.

It is evident, however, that previous efforts to instruct teacher trainees to acquire concepts in the foundation areas have not been notably successful. And if concepts are the bases for classifying and interpreting events in the schools, then teachers are handicapped until they become confident in making accurate interpretations and classifications. Protocol materials are conceived as materials that will assist the trainee in acquiring conceptual knowledge that will enable him to interpret professionally the world in which he lives. This document presents information derived from the experience of those who have been engaged in the production of protocol materials.

The development of protocol materials in teacher training began with the summer of 1970 when project directors from ten sites met under the auspices and with the support of the Bureau of Educational Personnel Development, a division of the United States Office of Education. One additional site was designated to develop a consortium of institutions to field test protocol materials. The Office of Education also provided for a Leadership Training Institute (LTI) to be

formed whose purpose was to give technical assistance to the development
of protocol materials, coordinate their development, and help solve pro-
blems that might arise.

The LTI is chaired by B. Othanel Smith, Director; Donald E. Orlosky,
Associate Director; and Jean Borg serves as a Research Associate. Doris
Gunderson of the USOE is the Program Director. During the three years of
its existence the membership of the LTI has fluctuated but has usually in-
cluded about fifteen active members at any one time. Those who have served
on the LTI are: Robert E. Ardike, James A. Banks, James M. Cooper, William
Drummond, Ned Flanders, L. Harlan Ford, Vernon Haubrich, Charles Modiste,
Irving Morrissett, Alan C. Purves, Frederick A. Rodgers, Benjamin Rosner,
H. Del Schalock, Charles Schuller, Charles Scruggs, Roger Shuy, and Richard
L. Turner. It has been the task of the LTI to assist in the development of
protocol materials but the major responsibility for production rests with
the project directors.

The thirteen directors who assumed this responsibility during the
first year of production were: David Berliner, Far West Laboratory; Paul
Twelker, Teaching Research, Oregon State System of Higher Education;
Celeste Woodley, University of Colorado; Bryce Hudgins, Washington Univer-
sity; David Gliessman, Indiana University; Judith Henderson and J. Bruce
Burke, Michigan State University; Donald Cruickshank, Ohio State Univer-
sity; William Heiner, Bucknell University; Peter Dow and Anita Mishler,
Education Development Center, Inc.; Richard W. Lid, San Fernando Valley
State College (now California State University at Northridge); and the
Florida State Department of Education Project was established as the field
test agency under the management of Pauline Masterton. During the second
year of production, three additional sites were added including Walter

Borg at Utah State University; Theresa Love at Southern Illinois University; and Patricia Heffernan-Cabrera and William Tikunoff at the University of Southern California. Washington University of St. Louis discontinued after one year due to the difficulty in acquiring adequate media production personnel. Throughout the program some of the original personnel have been replaced by others and numerous assistants have helped in the program. Currently, the directors listed above have continued with the following exceptions: R.E. Myers at Teaching Research at Oregon, Frank Zidonis at Ohio State University, Edward Martin at Education Development Center, and G. Michael Kuhn manages the Florida State Department of Edu. on Project.

Most of the developmental work and the knowledge about production of protocol materials presented in this handbook was developed during the first two years of the program. Production is continuing and the number of producers has increased. This handbook should help those who plan to develop protocol materials to benefit from the efforts that have been put forth by others. This handbook also provides a record of some of the events that have taken place in the training of personnel in the production of materials, the problems encountered and the solutions attempted, a collection of documents that have been developed by project directors, the LTI, and others whose expertise has been sought to give assistance to the program.

In the first paper, "An Introduction to Protocol and Training Materials" David Gliessman, who helped develop the initial master plan and has also served as a project director, provides the definition of protocol materials. In defining protocol materials, it is useful to contrast protocol materials with training materials and this paper provides that distinction.

The next paper by Philip Smith raises questions and supplies some answers in the problems of working with concepts in the training of teachers. Professor Smith participated in study sessions under the direction of the LTI on protocol materials and his work on concepts combined his past study with the issues discussed within the LTI study group.

The third document in this handbook is "The Master Plan for the Development of Protocol Materials" prepared by B. Othanel Smith, chairman of the study committee composed of David Gliessman, Kevin Ryan, H. Del Schalock, and others. It provides the reader with the same orientation as given to the project directors when they began their work. Despite several efforts to modify the master plan, it has held up well enough that the changes in its improvement were regarded as too minor to be worth the effort. As a consequence, the master plan has remained as a foundation on which the protocol materials production has continued to be based.

"Protocol Materials in Teacher Education (Selection, Analysis, and Utility of Concepts)" was developed by B. Othanel Smith and Donald E. Orlosky after the protocol program had been underway about one year. The document was prepared to capitalize on what had been learned after a year of production and to provide a statement that describes and coordinates the work of the LTI, project directors, USOE personnel, and others who engage in the protocol program. Thus, the document is a coordinating statement as well as a statement that provides fundamental information on the nature of protocols and their production. The previously mentioned study groups shared heavily in contributing ideas that undergirded the writing of this paper.

5

The problems in production of protocol materials were exceeded only by the problems in the analysis of concepts. Thus, a conference was held for all protocol project directors and their partners in the media production to share each others problems and to work towards solutions. The conference was held in October, 1971 at Michigan State University under the general direction of Charles Schuller and Bruce Miles. Included in the conference was the presentation of papers by Bryce Hudgins and Richard Turner which had been requested by the LTI directors in preparation for the conference. In addition, the communication problems in visual and oral language were addressed at the conference and assisted through a paper by Wilfred Veenendaal, "Cues and Miscues to Effective Visualization" and a "Glossary of Basic 16 mm Motion Picture Production Terms." These four documents are provided in this handbook.

As production proceeded, it soon became apparent that standards for acceptable production were loosely defined. The LTI established a committee on Field Testing, Utilization, and Dissemination of Materials and assigned the committee the task of determining standards for protocol materials. The committee was chaired by Benjamin Rosner and included Roger Shuy, Richard Turner, and Charles Schuller. The protocol materials directors selected four directors to work with the LTI committee and these directors were Walter Borg, J. Bruce Burke, Frank Zidonis, and Edward Martin. Collectively they produced recommendations for standards and the final document which appears in this handbook was developed by Donald E. Orlosky and is called, "Criteria for Selecting Protocol Materials for Distribution." Plans call for the LTI committee on Field Testing, Utilization, and Dissemination of

Materials to apply the criteria and decide when materials are satisfactory for general distribution.

One of the major concerns in the production of materials is that personnel be adequately trained to produce materials that are of the highest possible quality. The training of personnel to carry out this task in the case of protocol materials has taken place within a relatively narrow group of professionals. Others have expressed interest in developing their own materials and there is no reason for production to be restricted to those few who have engaged in this pioneer effort. On the other hand, there are many reasons why potential producers should look carefully before they leap into the production of materials that have proven to be difficult to produce, conceptually rigorous to perceive, and unpredictable in terms of utilization and their effectiveness. Those who have spent three years or more of their professional lives to the development of conceptualization and of protocol materials have been willing to take the risks that such an effort is worthwhile. Others who also devote considerable time and energy to the production of materials will, no doubt, do so because they also feel the effort is worthwhile. If this handbook helps others to make their decision about producing materials and after deciding to enter into production to benefit from the work of others, ther this handbook will serve the purposes for which it was written.

AN INTRODUCTION TO PROTOCOL AND TRAINING MATERIALS

Professionals in teacher education have been as energetic (per-
haps the word is profligate) as any other educators in the production
of materials. Anyone who is on several publishers' mailing lists must
be impressed by the number of textbooks that enter the market each year.
One major publisher alone lists well over two hundred titles of avail-
able textbooks in teacher education. The most recent Catalog of Edu-
cational Motion Pictures (1970) available in the Film Library at Indiana
University lists approximately five hundred motion pictures in some as-
pect of professional teacher education. When one adds to this the var-
ious specialized materials (for example, programmed learning materials
and multi-media units) produced by such agencies as development labora-
tories, the number of material resources becomes staggering rather than
simply impressive.

In light of this abundance, one is a bit reluctant to argue for
more--unless it is clearly evident that certain important goals in teacher
education are not well served by existing materials. It is possible, in
fact, that a bias does exist in this general array of materials (with
some notable exceptions, of course). This bias seems clearly to be to-
ward informing in some sense of that word. Informing the teacher about
data, concepts, issues, methodologies and skills seems to be the major
purpose of much existing instructional material. Goals in the prepara-
tion of teachers, on the other hand, go far beyond the informational. The
acquisition of operable teaching skills is surely a universal emphasis
in teacher education programs. Competence in the less observable acts

of diagnosis, interpretation and evaluation is a hoped-for outcome of
most teacher preparation. Yet the means of achieving either of these
goals have been rudimentary at best. One has little confidence, to be-
gin with, that a sufficient number or variety of well-conceived mater-
ials exist for the attainment of goals such as these.

It was to the problem of achieving interpretive competencies and
operable skills that B.O. Smith addressed himself when he identified a
need for "protocol materials" and "training materials" in teacher edu-
cation. (Smith, 1969, 1970) Ideally, he viewed the preparation of
teachers as including two very general programmatic components: a theo-
retical or conceptual component and a methodological or skills component.
The first of these has as its aim the development of interpretive compet-
encies. These competencies are based on the acquisition of a functional
understanding of philosophical, psychological and social concepts as well
as concepts from the basic fields of knowledge (e.g. language, biological
sciences, the arts). The second component has as its aim the development
of the specific skills that are involved in teaching. These might include,
for example, skills in questioning, in conducting class discussion, in
test preparation, in evaluation and assessment. Practically speaking, it
is probably not wise to push the distinction between these two components
too far; in the reality of teacher preparation, such differential outcomes
cannot be neatly arranged.. However, the point of the distinction seems
sound: that in any teacher education program, the acquisition of both
interpretive competencies and specific skills should be major emphases.

Accomplishing either of these objectives is no small order. One will
not find an explicit strategy for doing so in Teachers for the real world
nor anywhere else for that matter. Smith's point simply was that newly

conceived and newly specified materials would be important in the development of any programmatic efforts to accomplish these objectives. Specifically, he identified a need for protocol materials to be used in the theoretical or conceptual component and training materials to be used in the methodological or skills component of teacher preparation. The conceptions behind each type of material are different and it is one of the purposes of this paper to introduce the characteristics of each. It is not altogether clear at this point, however, whether protocol and training materials will ultimately assume different forms or serve entirely distinctive purposes. It is simply too early in the process of development to tell. Hopefully, in the discussion that follows, the evolving nature of each type of material will be evident.

Protocol Materials

Protocol materials were originally conceived to be a documentary record (on audiotape, videotape or film) of the actual behavior of teachers and pupils in classroom and other school settings. This documentary material was to serve as raw material for interpretation using concepts basic to teacher education (for example, psychological, social and pedagogical concepts). The result of such interpretation would presumably be a more complete understanding of these concepts (because they would have been related to their referents in behavior) and an increase in the ability to use them interpretively. In a sense, protocol materials were to be a means of conjoining concept and behavior in an interpretive act.

A little thought tends to support the general reasonableness of this conception. Many of the concepts that form the substance of professional teacher education refer to behavior. That is, they are intended to describe or interpret actual behavior. Yet the means of treating these con-

cepts have been largely verbal, through printed material and classroom discussion. If teachers are to develop the ability to use concepts interpretively, however, verbal instruction alone is almost certainly insufficient. There must be an opportunity to observe and interpret on-going behavior using concepts in a systematic way. The purpose of protocol materials is to provide such interpretable, on-going behavior. In fact, Smith apparently used the term in the sense of an "original record" of behavior or behavioral events.

Beginning with this conceptual framework, the Office of Education began the development and production of protocol materials approximately two years ago. Initially, ten university-based projects were funded to develop pilot protocol materials based on a variety of psychological, sociological and pedagogical concepts. Not surprisingly, in retrospect, the actual process of developing such materials has turned out to be a decidedly more complex matter than was originally anticipated. In fact, the complexities of development have been the substance of a series of intensive meetings beginning with the inception of USOE funding and involving all project directors.

The developer of protocol materials is faced with a two-fold problem, an analytic one and a technical one. He ignores either at his peril. To put the matter all too simply, he must find a way to clearly exemplify a well defined concept or set of concepts in an audiotape or motion picture film of high technical quality. In this process, the developer may go wrong at any one or all of several points. One can, without apology, admit the occurrence of a full range of "wrong moves" in the pilot projects during the past two years.

In the analytic realm, the developer is faced with the problems of

selecting concepts that have some generality, utility and interpretive power; framing explicit definitions of the concepts that he does select; identifying the significant dimensions, components and behavioral attributes of his concepts; specifying situations to be taped or filmed that will contain unambiguous examples of these concepts. This is no small order of tasks which is probably one reason why such a level and refinement of analysis is not typically devoted to concepts in teacher education. One of the unexpected results of the protocol effort so far, in fact, is what it has revealed about the ambiguity of some of the working concepts in teacher education. At the same time, it has become clearly apparent that such a systematic analysis of concepts is at the heart of developing valid and useful protocol materials. Ultimately, each developer must conscientiously attempt to conduct such an analysis of the concepts upon which he has tentatively decided to base his protocol materials. One of the obstacles to fulfilling this requirement, however, is that the dimensions and standards of such an analytic process are not widely understood in teacher education. For this reason, a careful exploration and explication of this analytic process should be the subject of continued discussion and writing.

Somewhere between this major task of analysis and the technical problems of actual production, the developer is also faced with a problem in instructional design: deciding upon a format for his protocol materials particularly with reference to the complexity of the behavioral situations that he tapes or films. It is clear by now that the original conception of protocol material as an unedited documentation of behavior was an imperfect one. "Critical" behaviors do not always occur with sufficient frequency or clarity in on-going situations to

be "captured" by means of documentary techniques. In one way or another, the developers of the pilot materials have found it necessary to assure the occurrence and to increase the salience of the behavior exemplifying the concepts they have selected. This has been accomplished by various means including more or less subtle "staging" of events, judicious editing of the tape or film and the use of titles or labels identifying critical behaviors. The use of such techniques has certainly modified or broadened the original conception of protocol materials. However, this change has generally resulted from the experience of attempting to produce protocols that are conceptually clear. The philosophical and instructional implications of this change may well deserve continued analysis and discussion.

Thinking in terms of ultimate instructional strategies, a few developers have moved to the production of very brief film clips in an attempt to further isolate critical behaviors. The protocol project at Indiana University, for example, is concentrating on the development of protocol films in two forms: (a.) film clips that as clearly and "cleanly" as possible exemplify a given concept and (b.) somewhat longer films of complex behavioral events that are interpretable in terms of a set of such concepts. Thus, the learner might be introduced to the concept of "approving" or "accepting" reactions on the part of the teacher by viewing a number of brief clips simply showing teacher reactions to pupil responses. These clips will be carefully selected to exhibit different dimensions of approval or acceptance by a number of different teachers in different classroom settings. Once having acquired the concept, the student would be in a position to recognize examples or instances of it in longer films when the critical behaviors are embedded in more complex classroom interaction.

Furthermore, he would presumably be prepared to identify some of the antecedents and outcomes of approving or accepting pupil responses---in short, to incorporate the concept in a broader interpretive act. One might assume that such a progression from simple to complex portrayals of behavior would lead to a surer acquisition of the concept. This is an assumption that can and should be tested empirically, however, using carefully designed protocol materials.

Finally, the developer must attend to the problem of producing material of high technical standards. Patently "home made" tapes and films will not do. The developers of the pilot protocol materials have in large measure rejected the naive assumption that users will overlook technical inadequacy and lack of authenticity for the sake of having "conceptually sound" materials. Fortunately or unfortunately, the professional consumer probably reacts to technical quality as quickly and surely as he may to conceptual quality. The fact that the developer is producing materials that are unique conceptually does not allow him to "beg" technical standards. Having agreed that high technical standards are desirable, the task remains of specifying what these standards should be. This leads inevitably to questions of sound quality, picture quality and the means of assessing each.

Further technical questions concern the choice of specific media and, equally important, the "mixture" of media to be included in a single set of protocol materials. An especially vexing problem here concerns the place of printed material. Thus far, developers have tended to depend upon printed material (in copious quantity) as the instructional support for their protocol materials. The wisdom of doing this, in terms of obtaining wide and effective use of protocol materials, is certainly

an open question.

From all that has been said above, a few things should be evident. The successful development of protocol materials is a complex and exacting task. This is partly because it depends upon such varied conceptual and technical skills. However, it is also because the developer is working in a most difficult substantive area: the margin between concept and behavior, concept and referent. In short, the area of interpretation. The need is clear for continued theoretical, empirical and technical investigation to reduce this complexity.

Training Materials

Unlike that of protocol materials, the concept of training materials is not a new one even in teacher education. The use of materials specifically designed to aid in the acquisition of skills has a long tradition in industrial and military training as well as in education. In teacher education, a variety of training materials have been produced by universities, development centers and regional laboratories. These materials have been designed to be used in the acquisition of such skills as questioning, presentation of subject matter, conducting inquiry and motivating learning. This variety of materials is not characterized by a common format although those that are more widely distributed generally provide filmed examples of the skill in context. The media used include motion picture film, printed materials, audiotapes and slides. Because the skills involved in teaching are numerous, incompletely specified, and essentially unclassified, it would be difficult to judge how comprehensive these existing materials are even if they were completely catalogued. One gets the impression, however, of a great deal of unevenness and considerable redundancy in the skills treated. Some of the more widely distributed of

these materials, for example, concentrate on a rather limited (though not insignificant) set of classroom interaction skills.

A recent venture in the production of training materials is that undertaken by the National Center for the Development of Training Materials in Teacher Education based at Indiana University. Under Office of Education funding, associates ᶠ the National Center are developing training materials for the acquisition of teaching skills ranging from "making drawings that teach" at the elementary level to "teaching for mastery" at the secondary level. Several other funded projects are presently investigating areas directly related to the development of training materials. A project at the University of Miami (working within the Florida State Consortium) is attempting to describe and catalogue the available training materials in teacher education. A related project at Florida State University is developing a classification system for competency based teacher education. Finally, efforts are being made at a national level to begin a comprehensive identification of the significant concepts and skills to be incorporated in teacher education.

The demands for analytical thoroughness and technical proficiency are as central in the development of training materials as they are in the development of protocol materials. It seems clear that any teaching skill to be acquired through the use of training materials must be analyzed as carefully as are concepts in the case of protocol materials. Ideally, a skill should be selected in terms of its generalizability and utility; the selected skill should be specified and defined behaviorally; finally it should be analyzed for its components somewhat as concepts are analyzed for their dimensions and attributes. Ultimately, one of

the major instructional functions of training materials themselves might be that of presenting clear examples or instances of the components of a complex teaching skill.

Statements of technical specifications and standards are as applicable to training materials as they are to protocol materials. Training materials are likely to include a variety of media and, once again, the media used should not fall short in technical quality. An important consideration in the choice of media for both training and protocol materials is that of distribution. Because of certain technical characteristics of specific media and because of certain habits of media users, some types and mixtures of media are probably more easily distributed than others. The settings in which training materials are to be used, too, should have some influence on the media finally selected. It is apparent, then, that the analytic and technical tasks in the development of training materials are not dissimilar to those involved in the development of protocol materials.

However, the design of a format for training materials is likely to present the developer with some unique problems. Unlike the act of interpretation (which is essentially a cognitive process), the act of performing a complex teaching skill might well involve social and psycho-motor processes as well as cognitive processes. Furthermore, it is generally agreed that performance and feedback on one's performance is a critical element in skill acquisition. Finally, the range of skills involved in teaching vary greatly in nature and complexity. Such characteristics of teaching skills and skill acquisition seem to call for a considerable degree of innovation and experimentation in the design of training materials. Only a beginning seems to have been made in fitting

the format of training materials to the special conditions and processes
involved in acquiring a complex skill.

Evaluation of Outcomes

The use of training materials is clearly tied to measurable out-
comes. Since the emphasis in such materials is often on overt or ob-
servable skills, the problem of evaluation is greatly simplified. At
the most elementary level, the evaluation task consists of noting whether
or not the learner can demonstrate a given teaching skill in, perhaps,
a simulated setting such as microteaching. As long as a skill is defined
and specified bei aviorally, it should be possible to observe its presence
with some degree of reliability.

It is a bit surprising, however, to note that the same emphasis on
measurable outcomes has characterized the development of protocol mater-
ials from the beginning. In this case, after all, one is dealing with
the kind of complex cognitive process which has often discouraged attempts
at evaluation. However, the early emphasis on a careful analysis of the
concepts to be used in protocol materials did much to lay a foundation
for objective evaluation. If a concept can be defined and its attributes
in behavior identified, the acquisition of that concept is potentially
measurable. The general question for evaluation is whether or not the
learner can reliably identify instances of a concept in more and less
complex behavioral settings.

It is highly desirable that this acquisition of concepts and skills
be evaluated under conditions that are as near as possible to a "real
behavioral setting" and yet are manageable in terms of measurement. In
the case of skilled performance, as indicated above, the implication of
such a specification is that the learner will be called upon to perform

the skill in at least a simulated classroom or group setting. In the

case of concept acquisition, the implication is that the learner will

be called upon to identify instances of a concept in taped or filmed

recordings of behavior rather than in printed descriptions of behavior.

The use of printed material can perhaps be regarded as an adjunct evalu-

ation device at best. In either case, it is clear that considerable in-

novation is called for in devising a format for evaluation. Once again,

especially in the case of concept acquisition, the development of the

needed evaluation instruments and strategies is only at a beginning

stage.

In spite of the importance and complexity of the above tasks, it

should be understood that assessing the acquisition of a specific con-

cept or skill is only a first step in the larger problem of evaluating

interpretive competence and teaching competence. Of course, the under-

standing of concepts is the basis of interpretive competence just as

specific skills are components of teaching performance in a larger sense.

However, at some point, evaluation must be directed at these more com-

plex levels of performance. In the case of interpretive competence, a

means must be devised to determine if the learner can use a set of ac-

quired concepts in a more complex interpretive act; in the case of skill

acquisition, a means must be devised to assess a learner's performance

in using skills appropriately and flexibly within a larger teaching act.

Such levels of evaluation will obviously depend on the development of

sophistocated instruments and methods of evaluation.

Next Steps

It should be apparent by now why this paper has attempted to do

little more than provide an introduction to protocol and training mater-

ials. The state of the knowledge about each is introductory at best.
The specifications for each type of material are tentative, the exist-
ing materials can only be regarded as first approximations, problems
of utilization have only been touched upon, the attempts at evaluation
are at a beginning level. If protocol and training materials are to
make a significant contribution to the preparation of teachers, two
needs are clearly in order. First, there must be a continued develop-
ment of concrete protocol and training materials. Actual production
is important not only for introducing needed materials into teacher
education programs but because each accomplishment and each misstep
clarifies future possibilities and directions. It is probably counter-
productive, in any case, to delay production pending definitive state-
ments; experience with actual products is instrumental in shaping de-
finitive statements. In the case of protocol materials, for example,
much of the early speculation and discussion about their "proper form"
proved to be academic once actual materials were available for evalu-
ation and use.

On the other hand, a consistent danger for those involved in mater-
ials production is the tendency to focus entirely on their products.
The result is that problems of definition are given little attention.
Problems of materials specifications, of productive developmental stra-
tegies, of evaluative procedures and criteria are solved but only for
the producer and remain a kind of "private stock" of knowledge to be
rediscovered by other producers. The avoidance of this state of affairs
must become a primary need. Stated positively, the second point then is
that it is equally clear that there must be continuous writing and dis-
cussion of the conceptual, technical, developmental bases for each type
of material. Intelligent planning and production cannot occur without it.

CONCEPTS IN RELATION TO PROTOCOL MATERIALS
AND TRAINING MATERIALS

A concept is a cluster of meanings named by a term. For example, the word "chair" not only names each of those real and imagined objects that may properly be called chairs but it also names the concept 'chair'. This is to say that every person who understands the word "chair" has in his mind, so to speak, a collection of meanings that are marshalled around or held together by this term. The term "concept" is, therefore, a mentalistic term; what it names is a group of meanings. And meanings exist in the mind.

How is it that we who are interested in observable human behavior are concerned about such a mentalistic notion? It is because we use constructs such as "concepts" and "learning" to account for the behavior that we observe. We say that concepts are developed through experience, including, of course, experience with language. Concepts function in subsequent experience to enable one to recognize objects and events and to make distinctions. Without the concept 'chair' we would not recognize a chair when we saw it. That is, we would not see the object as a chair. Nor could we differentiate a chair from other objects with similar shape and appearance. As we use our concepts they undergo refinement and enrichment, especially if we are guided by a teacher. The cluster of meanings that constitute the concept undergoes reconstruction.

Even though meaning runs deeper than language (Hullfish and Smith 1961) and not all language is exoteric or public (Vygotsky 1962), to

Philip G. Smith is Professor of Education and Chairman of the Department of History and Philosophy of Education, Indiana University.

the extent that meanings are embodied in public language, concepts and their role in experience can be studied by inferences from observable behavior. In a short paper it is not feasible even to touch upon all of the issues and problems connected with the nature, acquisition, and function of concepts. But in order to understand the way in which concepts are related to protocol and training materials it will be necessary to discuss the meaning of "meaning".

Modes of Meaning

While there are a number of theories of meaning available, for our purpose perhaps the most useful is the comparatively simple and non-controversial explication of four modes of meaning by C. I. Lewis (1946): denotation, signification, comprehension, intension. As we consider these modes of meaning we shall speak of the meaning of terms or words. But if we remember that each term also names a concept, we see that the four modes of meaning of a term constitute that part of the meaning of the concept which is readily available for public discussion. The fact that this does not fully exhaust the meaning of the concept for any actual person accounts for some of the misunderstanding and variance in meanings that is so typical of human interaction and communication.

For Lewis, the denotation of a term is the class of all actual things to which the term correctly applies. For example, the denotation of the term "aggressive behavior" is the class of all actual behavior that may properly be called aggressive. Since protocols are records (films, tapes, transcripts, etc.) of actual objects and behavior, we see immediately that what protocols present are instances or examples of the meaning of concepts in the denotative mode. Strictly speaking, a protocol does not instance or

portray a concept. For a concept is not directly observable.

Lewis defines the signification of a term as that property of things the presence of which indicates that the term correctly applies, and the absence of which indicates that it does not apply. Said differently, signification is constituted by the necessary and sufficient attributes which something must have if it is correctly to be included in the denotation of the term in question. Just exactly what characteristics must behavior have in order to be called correctly "aggressive behavior?" To the extent that we are a bit fuzzy or vague about this, our concept 'aggressive behavior' is fuzzy or vague. It follows that without at least some rudimentary meaning in the mode of signification we will not recognize aggressive behavior when we see it (that is, we will not see it as aggressive) and we will be unable to differentiate it from other kinds of behavior. The more precise our meaning in the mode of signification the more exact and dependable the distinctions we will make.

Protocols that are to be used in helping students refine their concepts should be constructed in such a way that the characteristics or attributes that constitute signification should be manifest without too much distracting incidental material. This is why a certain amount of staging may be useful in the construction of protocols. On the other hand, after the signification is clear and precise, a student should be able to recognize and differentiate on the basis of signals that are fully embedded in all of the incidental irrelevancies so typical of actual human interaction.

These two modes of meaning, denotation and signification, are, perhaps, most critical in connection with the use of protocol and train-

ing materials. But a grasp of comprehension and intension are also useful for a pedagogical understanding of concepts. Lewis defines the comprehension of a term as the classification of all possible or consistently thinkable things to which the term would be correctly applicable. In other words it is comprehension that enables one to generalize and to extend the notion of denotation beyond the actual, that is to what can be imagined as possible.

Finally, Lewis says that the intension of a term is to be identified with the conjunction of all other terms each of which must be applicable to anything to which the given term would be correctly applicable. Meaning in this mode typically remains tacit but exerts a powerful influence in communication. When critical portions of intension are made explicit it reveals what is "intended" by the elliptical expressions all of us use and depend upon in ordinary conversation or even in technical writing. When the expression "aggressive behavior" was used (in the second paragraph above) it was elliptical for "aggressive human behavior." I intended that the term "human behavior" should apply to anything to which the term "aggressive behavior" applied. We see that in teaching a concept, perhaps especially in connection with technical and theoretical concepts, unless we can develop some degree of both richness and accuracy of meaning, a concept that is even technically precise is likely to remain either non-functional or else to serve merely as jargon.

Closely related to intension - in fact intertwined with it - is a psychological mode of meaning sometimes called connotation. This includes more personal, idiosyncratic, and cultural overlays of meaning.

For example, for most of us the intension of the term "teacher" would probably include terms such as "person," "literate," and, perhaps, be overlaid with "adult," "professional," "articulate," "educated." For some students the connotative intension of "teacher" may include "arbitrary," "insensitive," "bookish," "impractical."

The point of all this is that in guiding the development and refinement of concepts, attention should be paid to all four modes of meaning. When denotation is neglected the concept may remain empty, that is, merely verbal. When signification is neglected, the concept may remain vague or fuzzy. A neglect of comprehension may leave the concept useless for generalization and imaginative projections. Lack of concern for intension may leave the concept either in such skeletal form or else so obese with strange connotations that useful communication is seriously impaired.

Concepts Useful to Teachers

No doubt some significant part of teaching and classroom management is largely a matter of good common sense. This is more or less true of every professional practice. But if good teaching were entirely a matter of common sense there would be little point in requiring a college education for teachers. Remembering that it is concepts that enable a person to make distinctions, we see that the teacher who depends entirely upon common sense concepts will make only common sense distinctions. If the concepts are vague the distinctions will be vague. If the teacher lacks the concepts that are most relevant to the task or problem at hand, then he or she will be unable to make the distinctions that are needed to carry out the tasks or to solve the problem.

On the other hand, precise concepts enable one to make precise dis-
tinctions. Psychological concepts; psychological distinctions. Socio-
logical concepts; sociological distinctions. Logical concepts; logical
distinctions. Philosophical concepts; philosophical distinctions. Who
can deny that the work of a teacher involves psychological, sociological,
logical, and philosophical aspects or dimensions? Why should we constantly
be surprised that teachers, and teachers of teachers, who do not have the
relevant concepts in a reasonably clear and precise form are unable to
move beyond common sense to the level of professional practice?

It may be useful to note four general classes of concepts (not con-
tained in common sense) that are critically relevant to the work of the
teacher. It follows that there are, potentially, four classes of proto-
col materials.

The first two classes are indicated by a distinction made by Broudy
(1965). He suggested a distinction between repertoire knowledge of the
subjects to be taught and pedagogical knowledge of these subjects. The
point is that in any given subject matter the teacher needs so to speak,
both concepts to teach and concepts to teach with. Everyone agrees that
a teacher ought to know more than he teaches.

But just what constitutes the more? Is it merely that which would
be taught at, say, two or three grade levels beyond where the teacher is
teaching? No doubt this is part of it, but more critical to good teaching
are concepts that enable the teacher to grasp what he is teaching (i.e.
his subject matter teaching repertoire) in relation to considerations
that are both more fundamental and more comprehensive than the subject
matter being taught. The point of a high school science teacher taking
courses in the history and philosophy of science is not to enlarge his

repertoire of concepts to be taught in, say, high school physics or biology, but to provide concepts that enable him to teach these subjects more adequately. Of course, it is also true that such study may refine and enrich his repertoire of concepts to be taught, especially in the modes of comprehension and intension.

A third class of concepts useful to the teacher arise from those humanistic and behavioral studies usually referred to as education's "foundational" disciplines. That is, History of Education, Educational Psychology, Sociology, Philosophy of Education. The point of study in these foundational disciplines is to enable the teacher to develop interpretive competence. That is, to provide a cognitive context in which the work of the schools may be understood.

After study in educational psychology, a teacher ought to see (i.e. interpret) behavior in the classroom in a way that is significantly different from the way the same behavior would be seen by a person equipped with only common sense concepts. After the study of logic, epistemology, and value theory in relation to education, a social studies teacher, for example, ought to see and respond to a classroom discussion of a controversial issue in a manner that is noticably different from the behavior of an untrained layman. And the foundational disciplines should cast light upon not only the instructional and classroom aspects of a teacher's work but also upon the larger context in which his work has point and value--the community and the culture.

Now if the study of, say, child growth and development and psychological theories of learning does not, in fact, result in a significantly different way of seeing human behavior, then something is wrong with the way we are teaching these foundational subjects. And this lies at the

heart, of the point and purpose for the development of protocol materials.
And if a concept is to function in experience it must be developed in
all four modes of meaning. A student may learn to recite or to recognize
on a multiple choice test a correct definition of some psychological term.
But of what use is it to recite the definition of a term if you have no
knowledge (by acquaintance) of what the term denotes in actual human be-
havior. While the use of protocols. is not a substitute for all parts of
the didactics that is inevitably involved in every theoretical discipline,
the use of properly prepared protocols may supply that connection "with
the real world" that is missing in our present foundational programs.

Finally, some sub-set of the concepts from the foundational studies
are necessary for an intelligent grasp of the various teaching and manage-
ment procedures that are the mark of the skilled, professional practitioner.
Protocols that present examples of the denotation of these concepts are
frequently incorporated into training materials. This use can be illus-
trated by an example based on the work of M.E.J. Orme (1967) who developed
an instructional unit for teaching prospective teachers how to use "probing
questions":

> A trainee is asked to view a video-tape record of a five
> minute sequence of instruction. During the presentation
> of the video-tape, the instructor calls attention to cer-
> tain questions that the teacher on the video-tape uses,
> and describes these questions as "probes"--in this case
> as "critical awareness probes", and "redirect probes".
> After the video-presentation, the student is asked to
> read a brief written description of probing techniques.
>
> The trainee is then asked to plan a five-minute instruc-
> tional lesson in which he will attempt to ask "probing
> questions". The trainee then conducts the planned lesson
> and is video-taped while doing so. The instructor then
> replays this video-tape and points out to the trainee
> when he has correctly used the probing technique and when
> he has failed to do so.

Note that the first five minute video-tape is an example of pro-
tocol material. It is a record of a real teacher actually engaged in
teaching. But in this case the protocol is used as the first phase of
a training material package.

Note also that the training package includes written material that
the trainee must study in order to understand the meaning of "probing"
in the modes of signification and comprehension. This is to enable the
trainee to grasp the probing act-sequence not as a mechanical routine
to be memorized but as a professional precedure to be mastered with in-
sight and understanding.

Finally, note that even though insight and understanding is empha-
sized, the trainee is required to practice under the guidance of feed-
back and supervision until skill in this professional procedure is ac-
tually developed. It is this skill development dimension that marks
the essential difference between the purpose of protocol materials in
the foundational studies and in training materials.

To summarize what has been said thus far, we see that there are
four general classes of concepts beyond common sense that are critical
in teaching:

1. Concepts to be taught--from the conceptual structure
   of the subject

2. Concepts to teach with--from the conceptual foundations
   of the subject

3. Concepts for professional understanding--from the human-
   istic and behavioral foundations of education

4. Concepts for skillfull teaching--from the humanistic and
   behavioral foundation for professional practice

In each case, for the prospective teacher to "have a concept" in-
volves a clustering of meanings in four modes: signification, denota-

tion, comprehension, intension.

Conceptual Networks

Many concepts, especially those from common sense and from what might be called "conventional pedagogical wisdom", often seem to be quite meaningful in the mode of denotation alone. When first learning a foreign language, for example, we may learn the correct names for a series of unrelated objects as the teacher points to pencil, chair, knife, etc. What may go unnoticed is that in learning a foreign vocabulary we are learning not new concepts but new names for old concepts. And in using our native language for naming what we recognize, our very familiarity with the concepts involved makes it unnecessary for us to be consciously aware of the way that each of the concepts we use is related to a network of meaning.

As we attempt to move students beyond common sense to more technical, theoretical, professional distinctions, the situation becomes more like the problem encountered when one tries to learn a foreign language expression for which there is no exact equivalent in one's native tongue. Some discussion (in the native tongue) of the ways in which its meaning differs from close approximations may be helpful, but the new expression is not really grasped until one has gained enough command of the language and its related culture so that the new expression is actually used in thinking as one reads, listens to, and speaks the foreign language.

This analogy may help us to see both the strengths and the limitations of protocol materials when used for teaching students to think with the various "languages" of the humanistic and behavioral studies.

What protocols display or portray are real-life objects, behaviors, and events. The point of using them in instruction is to create a laboratory or clinical situation in which students practice using their concepts, under the guidance of the instructor, and thus enrich and refine their meaning. But if a student is to learn to see and to think about human behavior in the way that, say, an educational psychologist sees and thinks about it, then it won't do to teach merely a few key concepts in isolation from the theoretical network from which they draw their meaning.

For example, suppose one wishes to teach prospective teachers that the manner in which a classroom teacher reacts to student responses can convey to the students an acceptance or a rejection of the response, either in terms of the content of the response or the manner and behavior involved in it or both. And suppose that the reason for teaching the prospective teacher to make such distinctions is to increase understanding of the way in which different reactions tend to increase or decrease the probability that the given response (with respect to both content and manner) will occur in the future. It won't do merely to show prospective teachers a film that portrays a teacher making "accepting reactions" to various kinds of student responses. The prospective teacher needs to bring to the film a conceptual network that includes distinctions such as "response vs. reaction", "accepting vs. rejecting", "content vs. manner" plus reinforcement theory!

It follows that both makers of protocol materials and instructors who use these materials need to think (in a more explicit and precise manner than is customary) in terms of complex conceptual networks. Protocols provide examples of the denotation of some of the key terms in

the network. As in teaching a foreign language, little is gained by

ostensive tactics (e.g. pointing to something) unless the student brings

to the experience the network of meaning that enables him to relate

what is observed to the ideational complex that is at issue. "The situ-

ational approach is valuable because it enables the teacher to come very

close to reality. But being close to reality is insufficient. It is

interpretation of reality that is important in teacher education."

(B.O. Smith, 1969)

Inferential Distance

Norwood Hanson (1961) once remarked that there is more to seeing

than meets the eyeball. From an epistemological standpoint this raises

a series of interesting questions about the role and limits of sensory

data in human knowledge, the interrelation of concepts and percepts, the

role of implicit theory in common sense, and the like. But for our pur-

pose, the point is that all "seeing" is really "seeing as." We often

tell teachers that they ought to differentiate between what they observe

(e.g. in connection with student behavior) and what may be inferred from

what they see. But if the point of teaching concepts from the humanistic

and behavioral studies is to enable students to interpret reality (in

ways that are important and useful from a pedagogical standpoint) then

the observation-inference distinction may need some further discussion

and refinement.

Especially in connection with concepts that are part of a theore-

tical network, the question of the way in which they can be related to

observables arises. What is at issue here is not really the question

of the abstract versus the concrete but more nearly a continuum, some

points of which are designated by the ordinary language use of "recognizing-describing-interpreting-explaining."

Körner (1959) has pointed out that while it may not be possible to determine the exact degree of "distance" between a concept and its "empirical base", nevertheless, it does seem clear that any given concept appears to be more or less removed than other concepts to which it is or may be connected. For example, a teacher may suddenly recognize that the behavior of a certain student is disrupting the class, describe the behavior as showing off, interpret it as indicating a need for attention and explain its occurence as being the result of the unintentional reinforcement given to such behavior in the past. We see immediately: (1) That the way in which the behavior is recognized, described, interpreted, and explained depends not upon the behavior itself but upon the conceptual apparatus of the teacher. (2) That the terms "recognize", "describe", "interpret", "explain" are (in ordinary language) only inexact and overlapping distinctions. (3) That 'disruptive behavior', 'showing off', 'the need for attention', and 'reinforcement', are concepts that lie, so to speak, at different distances from what can be directly observed.

The instructional problem in teacher education is that, typically, the more powerful and useful the concepts, the greater the inferential distance. It's not very difficult to make a protocol that "shows" disruptive behavior. But what is the point in doing so? How can such a protocol be used in a program of instruction that relates reinforcement theory to the real world of the teacher? And it should be obvious that the way to solve this instructional problem is not by trying to construct a protocol that directly "shows" reinforcement. Surely what is needed is to make explicit the critical portions of the network of meaning--

a kind of conceptual map--so that one can trace the connections between the more distant concepts, the less distant concepts, and finally, to what can be directly observed and, hence, can be captured by protocols.

Without an explicit network of meaning that includes precise significations and reasonable richness and precision in the modes of intension and comprehension, the protocol maker's attempt at denotational display is likely to prove disappointing. Without such a conceptual map, instructors and students who try to use protocols (even protocols that have been properly conceived) are likely to find that they provide only a stimulus for unenlightened, common sense, comments and arguments about whether what was displayed was an example of good or bad teaching, good or bad student behavior, or the like. There is nothing in a protocol itself that will lift such comments to the level of theoretical-professional insight or understanding. Nevertheless, the proper use of properly prepared protocols holds great promise for doing exactly that.

THE MASTER PLAN FOR THE DEVELOPMENT OF

PROTOCOL MATERIALS

INTRODUCTION

It is generally recognized that teachers interpret the behavior of pupils, parents, fellow teachers, and others with whom they work. To prepare them to make more viable interpretations is one of the purposes of courses in psychology, educational sociology, and social foundations of education. Almost every teacher-in-training is required to take one or more of these courses during his period of preparation. All too often he learns a new vocabulary with little or no increase in ability to understanding human behavior -to classify or diagnose it, or to explain its occurrence. The failure of these courses to increase the teacher's understanding is due largely to the fact that the instruction is typically divorced from reality. Concepts and principles are taught in abstraction, although sometimes supplemented by brief periods of observation in classrooms, playgrounds, and recreation centers. The purpose of this program is to develop a supply of instructional materials to be used by the teacher educator as he attempts to make the concepts and principles he teaches more meaningful and useful in a practical context.

Educational technology has now developed to the point that it is not only possible but also practical to reproduce the behaviors of pupils and

---

This paper was prepared by B. Othanel Smith as a final committee report for the Bureau of Educational Personnel Development, U.S. Office of Education. April, 1970. B. Othanel Smith is Professor of Education and Director of the National Leadership Training Institute, University of South Florida.

other in all sorts of settings for use in courses in teacher education. A particular segment of behavior can be reproduced again and again as it is studied, analyzed, and the concepts appropriate to its interpretation understood and used again in other segments of behavior. The instructional materials to be developed in this program are of this type and are referred to as protocol materials. The nature of these materials is set forth more specifically in the following paragraphs.

THE MEANING OF PROTOCOL MATERIALS

There are two general categories of instructional materials for the preparation of teachers: those that direct the teacher-in-training in studying his behavior and that of others; and those materials that guide him in systematic practice of the skills he must acquire. All materials that enable the student to study behavior we refer to as protocol materials. Those which are designed to guide the prospective teacher in the systematic practice of skills we refer to as training materials. Put another way, instructional materials can be viewed in two categories-- skills and cognitions.

Skills are developed largely enough through the use of training materials. These materials provide for (1) identification of the skills, (2) description of behavior entailed by the skills, (3) performance of the behavior, (4) feedback to the performer and further performance by him. Cognitions, on the other hand, are developed primarily through the use of protocol materials. These materials provide for (1) segments of behavior categorized for the purpose of teaching concepts and principles used in interpreting behavior as well as the social context in which the teacher works, (2) segments of behavior categorized for the purpose of teaching knowledge about knowledge, (3) segments of behavior categorized

for the purpose of teaching self understanding.

A number of issues about the characteristics of protocol materials have arisen. The question has been raised as to whether or not protocol materials are to consist of ideal behavior segments. Are protocol materials to be segments of behaviors--good, bad, indifferent? Are protocol materials to be records of staged behaviors, or are they to be samples of behavior as it occurs under ordinary circumstances? Protocol materials may be any of these. Should protocol always be videotaped? Protocol materials may be videotaped, filmed, printed or audiotaped. There should be neither commentary nor interpretation in protocol material itself.

A second set of questions is concerned with whether or not the terms "protocol materials" and "training materials" are of the same order. These terms are naturally of different orders and this has given rise to a number of questions. This di _____ction is seen in the fact that when one says "training materials" we know what the materials are for. We know they are to be used in some sort of training. But when one says "protocol materials" we do not know the express purpose of the materials. All that we know is that they are supposed to be an authentic representation of educationally relevant behaviors.

Because these terms are not of the same order certain confusions have arisen. One of the most persistent of these is found in the question of deciding whether or not play-back of video or audio-tapes for the purpose of providing the student with feedback is to be called protocol materials. They are segments of behavior used to improve skill in teaching. They help the person in training to identify his mistakes and to see how he might go about correcting them. It is claimed by some that

the presentation of model behaviors illustrative of skills in teaching

to acquaint the person in training with the behavior he is to follow

entails the use of protocol materials; namely, the recorded model be-

havior. Again, this is a case of using the materials for the purpose

of developing skills and only instrumentally for the purpose of deve-

loping understanding.

The crucial criterion is what the materials are used for. When

recorded behavior is used as a model to be imitated in practice or as

feedback by which one may correct his behavior, the materials are in-

struments of training and are used only incidentally to develop theo-

retical concepts and principles. Of course, some theory is learned ·

through the "training materials", but it is minimal and instrumental

to the skill. Protocol materials develop no teaching skills but do

induce concepts and principles which are used in interpreting what the

teacher observes and works with.

In order to develop protocol materials in an orderly way it is nec-

essary to follow a general plan. The plan should be as comprehensive

as possible and free of doctrines and theories about what teachers are

to be prepared to do and how they are to be prepared to do it. If

these conditions are satisfied, those who are engaged in teacher edu-

cation would be able to take part in a national effort to develop ma-

terials without being framed by theories and doctrines to which they

cannot subscribe. The following pages describe such a plan.

COMPONENTS OF THE MASTER PLAN

The master plan consists of two basic interrelated components or

sub-plans: one for the pedagogical domain and one for the basic fields

of knowledge. Each sub-plan will be presented in the form of a coordinate system comprised of three dimensions.

PEDAGOGICAL PLAN

The pedagogical plan is a coordinate system comprised of three generic categories: setting, level, and behavior. These terms are defined later, but for immediate purposes "setting" refers to the context in which behavior occurs, "level" stands for the stage of a person's general development, and "behavior" for observable activities. Figure 1 depicts the master system which is described in detail in the pages following.

In order to indicate the various types of protocol materials that can be developed in accordance with the Master Plan, it is necessary to derive subordinate coordinate systems. These are set forth after the the Master Plan has been presented. The categories and sub-categories in the system below are purposely general. The lack of a high degree of specificity under the category "Teacher-Pupil" or sub-category "Instructional: Skill", for example, allows the developer a high degree of flexibility in deciding upon the specific behaviors he wishes to record. It should be remembered that the categories are intended to help assume an adequate coverage of settings, behaviors, and levels in the protocol materials to be developed. They are not intended to be a framework for interpretation or dissemination.

Figure 1

Master Coordinate System of Settings, Behaviors, and Levels
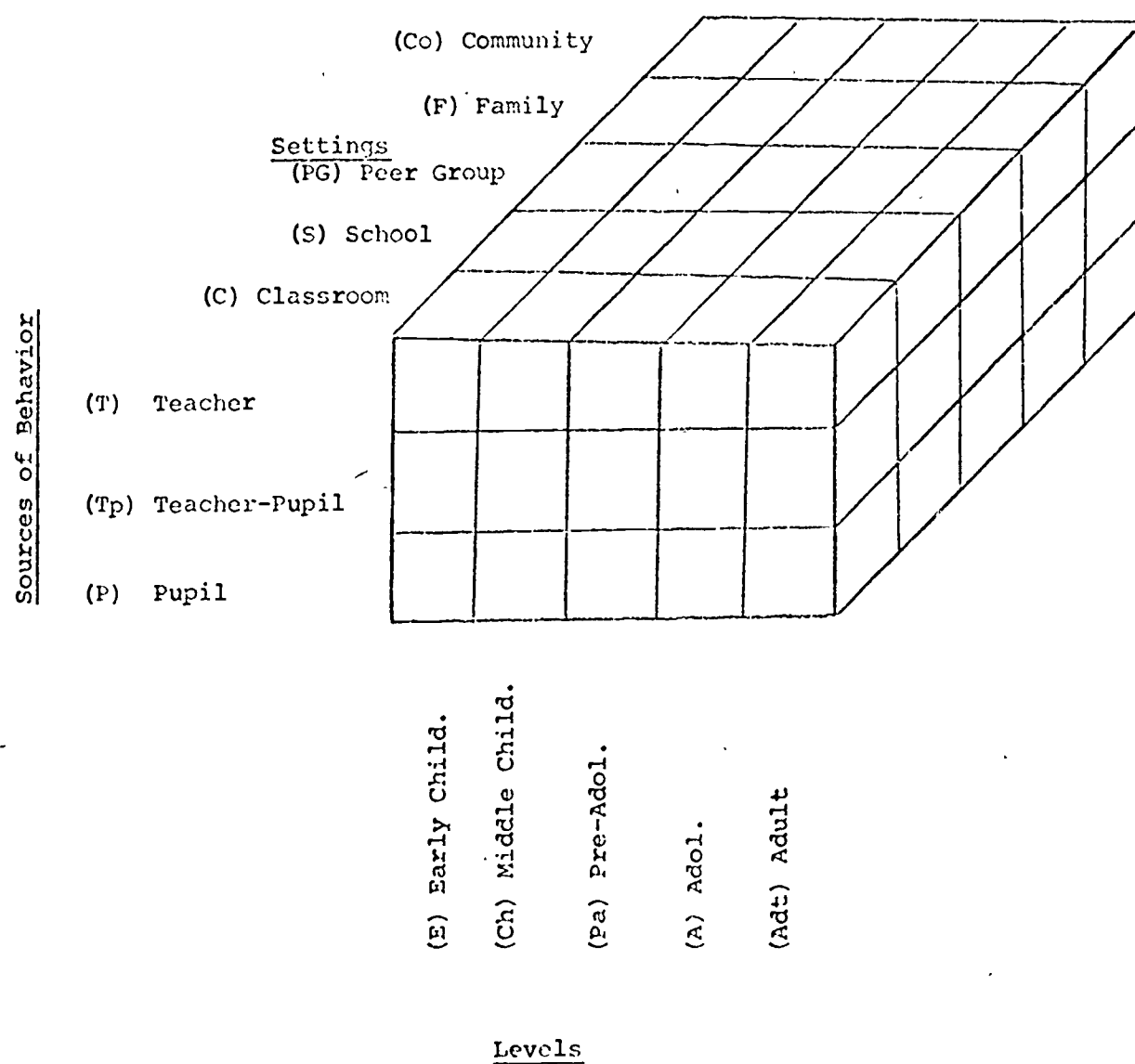
Levels

1. Definitions

The major categories are named in Figure 1. We shall first define the kinds of settings, then the kinds of levels, and finally the sorts of behaviors.

A. Settings. We shall use the term "setting" to designate the context from which the protocol material is taken.

(1) Classroom. Any room in a school building in which the activities carried on are intended to promote learning, or more generally, any place where the activities are conducted with that intention.

(2) School. Any establishment for teaching and learning.

(3) Peer Group. A number of individuals of approximately the same age forming a recognizable unit either in school or out.

(4) Family. Any group made up of parents and their children.

(5) Community. The people who live in a district or city under the same laws and institutions.

B. Levels. We shall use the term "level" to refer to the periods or phases of a person's growth from birth to adulthood. It is assumed that the developer may wish to focus on certain "types" of children or adolescents such as emotionally disturbed, or mentally retarded.

(1) Early Childhood. The period from infancy to the time the child begins school.

(2) Middle Childhood. The period between early childhood and the beginning of adolescence. Roughly the elementary school years.

(3) Pre-Adolescence. The transition period between middle childhood and the adolescent period. Roughly the junior high school years.

(4) Adolescence. The period immediately preceding adulthood. Roughly the high school and early college years.

(5) Adult. Post-adolescent years.

C. Sources of Behavior. We shall use this expression to refer to the observable actions of a person, verbal and non-verbal.

(1) Teacher Behavior. Any behavior that a person exhibits as he engages in performing the tasks of a teacher such as questioning, explaining, assigning, conferring, and managing a classroom or as he takes part in extra-classroom activities.

(2) Teacher-Pupil Behavior. Any behavior that involves interaction between a pupil and a teacher.

(3) Pupil Behavior. Any behavior that a child or adolescent exhibits as he attempts to meet the situations that face him from moment-to-moment throughout the day.

2. How to Interpret the Master System

By giving each category a code letter we can indicate each three dimensional cell by three letters. In Figure 1 CAT indicates a cell. The first of the three letters (C) stands for the kind of setting, the second (A) for the level of development of the pupil, and the third (T) for the source of the behavior. The protocol materials for this cell would consist of reproductions of teacher behavior in classrooms at the high school level. By the same token, the protocol materials that depict pupil behavior at the adolescent level in a family setting can be indicated by the letters FAP.

V. SUBORDINATE COORDINATE SYSTEMS

1. How the Sub-Cells Were Derived

The subordinate systems in Figures 2, 3, and 4 result from expanding each of the behavior categories in Figure 1 while leaving the "setting categories" and the "level categories" unanalyzed. In Figure 2, category P has been expanded into behaviors that allow the development of protocol materials to show the social, personal, and cognitive development of pupils. In Figures 3 and 4 respectively, categories Tp and T have been expanded into kinds of teacher behavior. Figure 3 represents a model in which teacher-pupil behavior is included while Figure 4 represents teacher behavior as he interacts with peers and others.

2. Definitions

The definitions of "levels" and "settings" and their sub-terms for Figures 2, 3, and 4 are the same as the definitions of these terms and sub-terms for Figure 1.

A. Types of Pupil Behavior in Figure 2

(1) "Cognitive behavior" refers to the behavior of pupils that entails the process of knowing: perceiving, conceptualizing, inferring, classifying, etc.

Figure 2

Expansion of P Category for all Settings and Levels
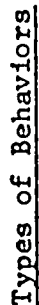
Figure 3

Expansion of **Tp** Category for all Settings and Levels

Types of Teacher-Pupil Interaction

Settings

(Co) Community

(F) Family

(PG) Peer Group

(S) School

(C) Classroom

(Ic) Instructional:Cognitive

(Ia) Instructional: Affective

(Is) Instructional: Skill

(Cm) Classroom Control
and Management

(Sd) Social-Personal
Development

(E) Early Child.

(Ch) Middle Child.

(Pa) Pre-Adol.

(A) Adol.

(Adt) Adult
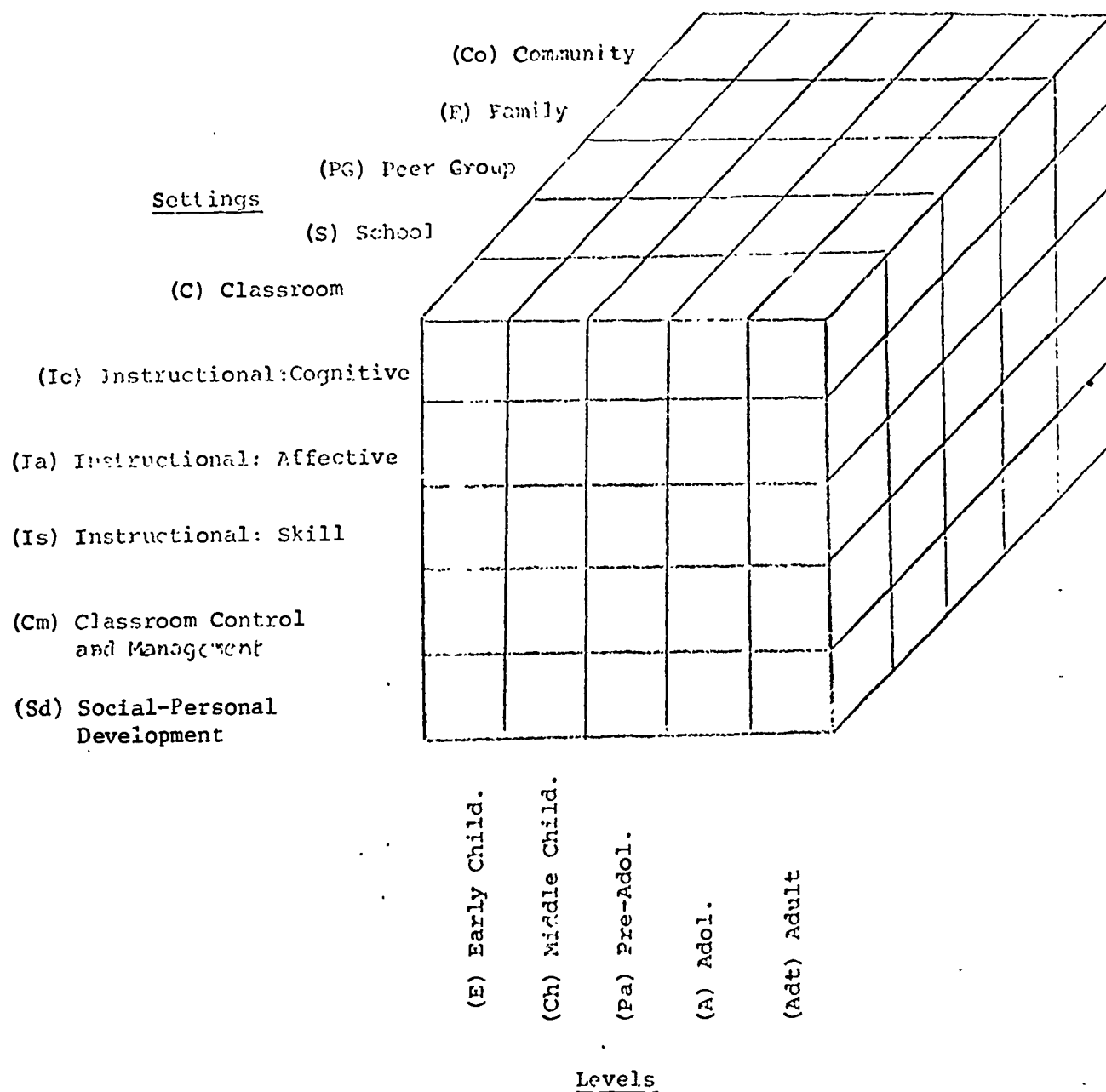
Levels

Figure 4

Expansion of T Category for all Settings and Levels
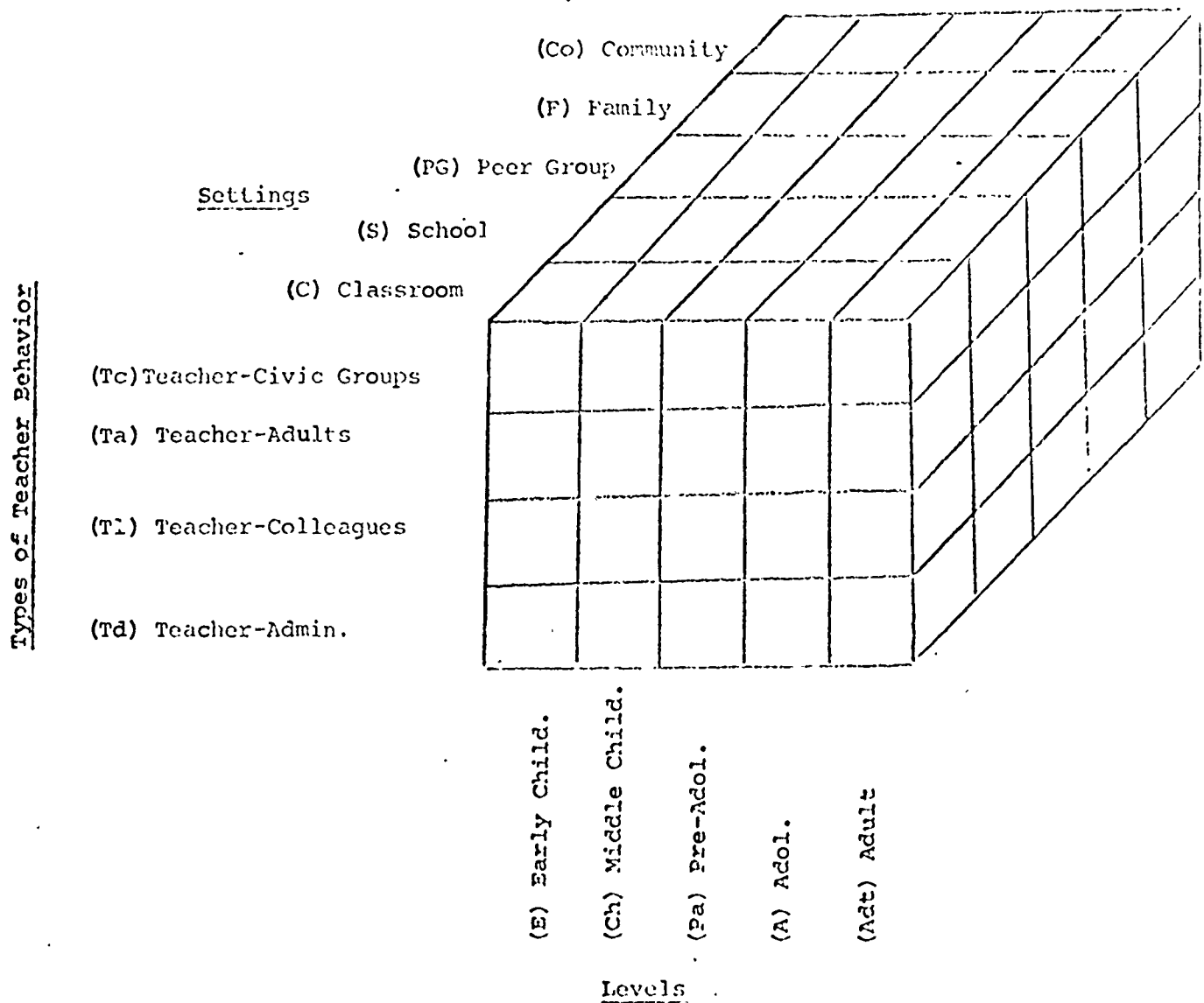
(2) "Affective behavior" refers to pupil behavior in the areas of motivation, valuing, commitment, personal choice, etc.

(3) "Social behavior" refers to pupil behavior characterized by such processes as social cooperation, competition, authority relationships, etc.

(4) "Skills" refers to such cognitive or psycho-motor behaviors as spelling, penmanship, typing, woodworking, gymnastics.

B. Types of Teacher-Pupil Interaction in Figure 3

(1) Instructional: Cognitive--Interactions in the cognitive realm, such as conveying information, building concepts, explaining, diagnosing of difficulty in understanding.

(2) Instructional: Affective--Interactions in the affective realm, such as motivating, attitude formation and re-formation, influencing techniques.

(3) Instructional: Skill--Interactions in the realm of cognitive skills (such as word analysis, spelling) and physical-coordinative skills (such as typing, woodworking, gymnastics).

(4) Classroom Control and Management--Interactions involving classroom control and discipline, especially social and physical control.

(5) Personal-Social Development--Interactions involving personal development of pupils in such areas as responsibility, personal concerns, social relationships.

C. Types of Teacher Behavior in Figure 4

(1) The expression "Teacher-Civic Groups" refers to the behavior of one or more teachers in community groups where educational policies, programs, etc., are being considered: parent-teacher groups, open sessions of Boards of Education, special interest groups, etc.

(2) "Teacher-Adults" is used to refer to the behavior of a teacher in conference with a parent, or other adults of the community about the education and welfare of pupils.

(3) "Teacher-Colleagues" refers to teacher behavior in situations involving other teachers, school psychologists, social workers, or counselors where pupil problems, school programs, etc., are being considered.

(4) "Teacher-administrators" is used to refer to teacher behavior in conferences with principals, supervisors, department heads, and the like.

3. How to Interpret the Subordinate Systems

Using the code letters of each category, we can see by reference to Figure 2 that protocol materials that depict cognitive behavior at the pre-adolescent level in a classroom can be indicated by the letters CPaCc. In Figure 3, protocol materials showing concept building at the pre-adolescent level can be designated by CPaIc. In Figure 4, protocol materials that depict teacher behavior in a civic group concerned with high school pupils in the community can be designated by CoATc.

It should be noted that there are no empty cells in Figure 2, because each type of pupil behavior can be studied in every setting for each level of development. Nevertheless, it is likely that some types of behavior are more appropriately studied in some settings than in others. For example, cognitive behaviors can be studied perhaps more appropriately in the school room or family than in the broader community setting.

Figure 3, has a number of empty cells. This is so because teacher-pupil interaction is typically limited to classroom and school settings. All the cells bounded by peer group, family, and community dimensions are likely to be empty.

Likewise there are empty cells in Figure 4. For example, no protocol materials are likely to be developed in cell PgETc because Teacher-Civic group behavior is not ordinarily exhibited in pupil peer groups. It is easy to ident , other empty cells in Figure 4 by the same criterion.

PLAN FOR THE BASIC FIELDS OF KNOWLEDGE

The term "basic fields of knowledge" is used to refer to all subjects of instruction except those in Education. It covers vocational and technological subjects, arts, and the conventional disciplines such as physics, history and mathematics. The plan set forth here provides for the development of protocol materials to teach certain things, not ordinarily taught in college courses, about the content of these subjects. For example, the content of a course in history may be biased against a minority group or it may be composed of certain elements of

knowledge--concepts, values, generalizations--and yet the teacher-in-

training may miss these aspects. The development of protocol materials

will help to provide instruction in these neglected aspects of the sub-

jects of instruction.

The basic-fields-of-knowledge plan is a system of coordinates

made of three generic categories: Areas of Knowledge, Levels, and

Types of Knowledge about Knowledge. Figure 5 represents this system

of coordinates. The expressions used in Figure·5 are defined below:

1. Definitions

We shall give the uses of the expressions "Areas of Knowledge" and "Types of Knowledge about Knowledge" and then define the terms designating the sub-categories.

A. Areas of Knowledge. This expression is used to refer to the various classes of arts and sciences. (Over 350 subjects are offered in the public schools.) To represent these in a three dimensional grid requires that they be reduced to a few categories. This is attempted in the following definitions adapted from Tykocine.·'s Outline of Zetetics (1966).

(1) Symbolics. This is an area of knowledge that includes language arts, mathematics, and logic.

(2) Arts. This term is used to refer to the area that includes dramatics, graphic arts, music, painting, sculpture, literature, industrial design, choreography, and architecture.

(3) Science of Matter and Energy. This group is made up principally of physics and chemistry but it also includes astronomy, geology (earth science), and mineralogy all of which are unified by the principle of equivalence of matter and energy.

(4) Biological Sciences. This group treats living things, as exhibited in growth and reproduction. It includes botany, zoology, morphology, genetics, and cytology, and is related to 3 above by biophysics, and biochemistry, and to psychological sciences by physiology.

(5) Psychological Sciences. This term is used to refer to the sciences of behavior of living things. It includes principally individual psychology, group psychology, and social psychology.

(6) Sociological Sciences. This group includes the sciences which deal with the various facts about, and forms of, group life-- demography, geography, social institutions and ethnology, and is related to the historical studies by anthropology.

Figure 5

Master Coordinate System of Areas of Knowledge, Knowledge
about Knowledge, and Levels
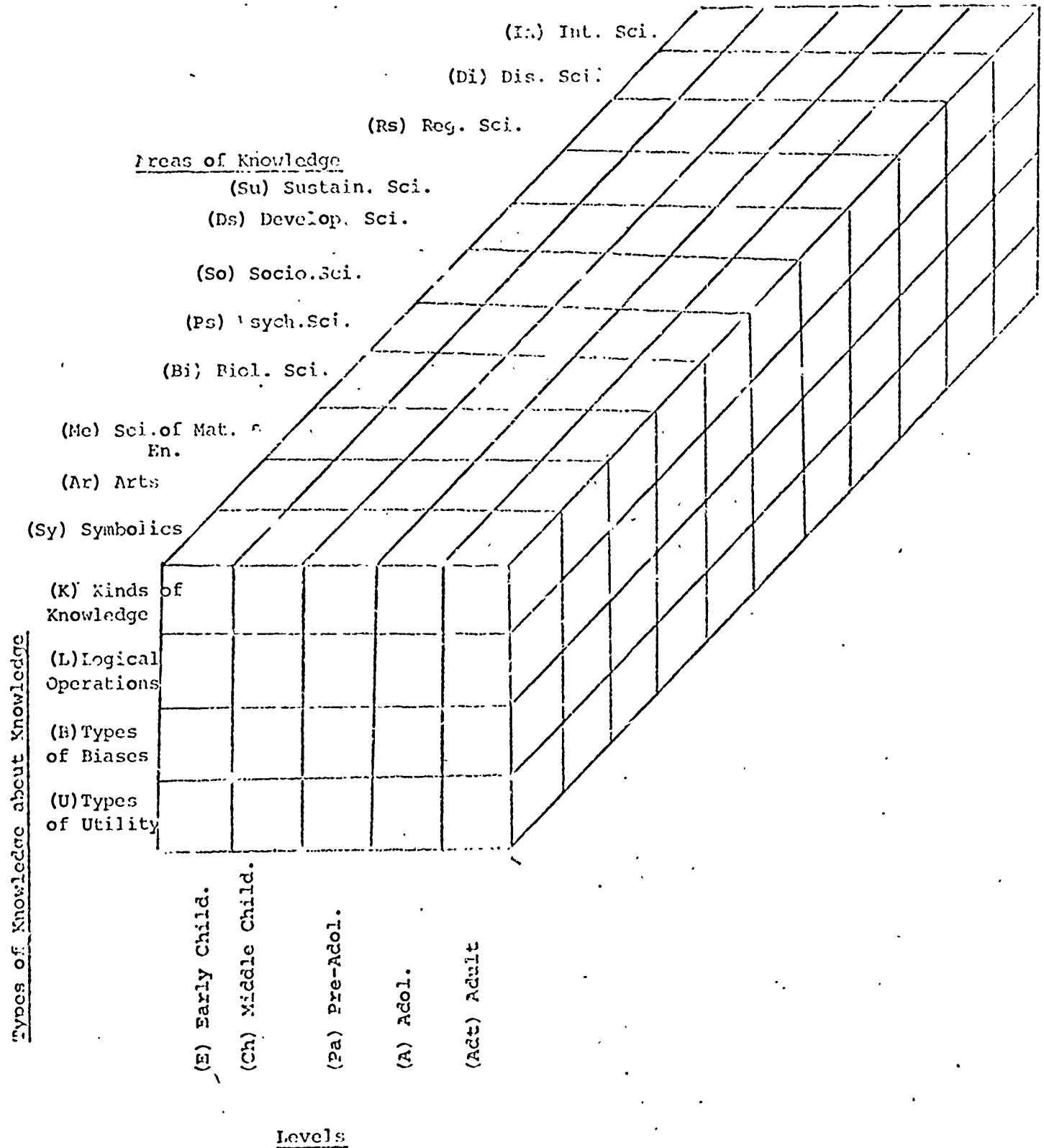
(7) Historical Sciences. This group is comprised of those
[...] [...] are concerned with the past, including cosmic evolu-
t[...] [...] [...] the history of cultures. Among these are cosmogony,
[...] [...] of geology and biology, and the history of mankind.

[...] [...] Sciences. The aim of all these studies is to
maintain life and to advance its welfare. This group includes health,
[...] medicine, public hygiene, and, at a more sophisticated level,
agriculture, medicine, engineering, and technologies (manual arts,
home economics, metal working, and other vocational subjects).

(9) Regulative Sciences. These are the areas of knowledge that
are concerned with sustaining cooperation among men as they strive to
satisfy their individual and collective needs. They attempt to keep
the various elements of society adjusted to one another. Among these
sciences are economics, political science, jurisprudence, and management
(business education).

(10) Disseminative Sciences. This group includes those sciences
which are concerned with the task of transmitting information accumulated
from generation to generation. Among these are library science, peda-
gogy, and journalism.

(11) Integrative Sciences. These studies attempt to bring knowl-
edge to bear upon such questions as consistency of knowledge, man's
purpose, and his destiny. Among these disciplines are philosophy,
theology, and ideologies.

B. Levels. This term has been defined on page .

C. Types of Knowledge about Knowledge

(1) Kinds of Knowledge. This term refers to the epistemological
elements of instructional content such as laws, concepts, rules, values,
procedures, and facts.

(2) Logical Operations. By this expression is meant logical
relations and such operations as defining, explaining, classifying, and
valuing.

(3) Types of Biases. This term refers to adherence to a point of
view in the selection and interpretation of the content of instruction.
(In some cases the point of view may be socially neutral as in the so-
called new math or in the different approaches to biology, chemistry, and
physics. In other cases it may be socially deleterious. For example,
biases about power, social classes, labor, management, and the like can
be injurious to the well-being of certain groups or to the public welfare.)

(4)   Types of Utility.   This expression refers to the uses to
which the various kinds of knowledge and logical operations can be put
by pupils and adults as they carry on the normal activities of life.
For example knowledge may be used in repetitive, associative, appli-
cative or interpretive ways or in making decisions or in justifying
actions.

2.   Settings.   It should be noted that the "setting" category has been
replaced in the basic fields schema by the category--"Areas of Knowledge".
This means that no settings are indicated for the development of
protocol materials in Figure 5, for "Areas of Knowledge" are not
settings but realms of content.

In what settings may materials concerned with the content of in-
struction be developed? A few settings are suggested here as examples.
Some may be taken from the classroom. Others from public school text-
books, and still others from newspapers, magazines, and radio and tele-
vision broadcasts. For example, protocol materials to show the utility
of certain elements of scientific knowledge may be taken from articles
in newspapers where such knowledge is being used. The analysis of the
protocols would attempt to show how the knowledge is used in an article
as well as how the reader uses his own knowledge as he reads it.
Similarly, protocol materials to depict elements of knowledge--concepts,
values, generalizations, etc.,--in history may be taken from classroom
discourse where the content of history is being discussed. The analy-
sis of the protocols would help the teacher-in-training to identify the
elements as they appear in teacher-pupil interaction.

3. How to Interpret the Basic Fields of Knowledge Plan. Protocol
materials developed to show how economic knowledge studied in high school
is used in out-of-school life are placed (Figure 5) in cell RsAU.
Similarly materials that are to be used to show the racial biases of
classroom discourse in a junior high school course in history are placed
in cell DsPaB. If protocol materials are developed to show the elements
of knowledge in elementary school geography, they would be located in
cell SoChK. Other materials can be distributed in their proper cells
by reference to the various categories in Figure 5.

PROTOCOL MATERIALS IN TEACHER EDUCATION

In this article we shall consider the development of protocol materials from the standpoint of the developer. What questions must he consider? At what points must he make decisions and what should he take into account as he makes these decisions? This is a perspective from which this paper is written but it is not assumed that the order of exposition is necessarily the order of empirical development. The sequence in which the various points are considered in this paper is not necessarily the order in which they would be taken up in the development of a protocol.

THE SELECTION OF CONCEPTS

In order to begin his work the developer must select an area in which he wishes to portray concepts. Let us assume that after taking into account a number of factors, for example, his interests, abilities and resources he chooses to work with Teacher-Pupil interaction in the classroom at the junior high level. He might choose a different grade level, a different setting (school, peer group, family, community) or a different source of behavior are choices that narrow the eventual protocol material to a specific situation.

This paper was prepared as a final committee report by B. Othanel Smith and Donald E. Orlosky. 1971.

B. Othanel Smith is Professor of Education and Director of The Leadership Training Institute, University of South Florida.

Donald E. Orlosky is Professor of Education and Associate Director of The Leadership Training Institute, University of South Florida.

The developer must select the sort of interaction for which he will prepare a protocol. Let us suppose that his interest, resources, etc., lead him to select classroom management and control at the junior high school level.

The developer now knows the area of teacher preparation he is to focus upon, but he still does not know what he is to do in that area. Which way of conceptualizing the various classroom disruptions and problems of management and control should he select? Should he consider only the concepts that interpret the most frequent types of disruption? Or those which enable the teacher to diagnose the most serious disruptions? Should he emphasize those concepts which imply teacher control or those which lead to group control? How the developer answers these questions will depend upon the social and psychological orientation he brings to the task of developing protocols. But it makes little difference which point of view is taken by a particular developer so long as the total number of protocols worked out do not neglect significant concepts regardless of the orientation to which they belong.

However, there are considerations in the selection of concepts which place more restraint upon the developer. These are by implication included in the foregoing suggestions, but they are so basic to the development of a systematic program of teacher preparation that they should be given explicit attention. Concepts seldom stand alone in total isolation. They are usually related, or relatable, to other concepts, forming some sort of conceptual network. The power and utility of a concept depends in part upon the network to which it belongs.

There are at least three kinds of conceptual networks found in educational literature. The first is a framework in which common sense

identifies and relates concepts to each other either by psychological or material associations, although the concepts are vague and ambiguous and the associations are typically tenuous. There is a set of common-sense concepts about classroom control, some members of which are still to be found in the literature of education as well as in educational practice. Among these are rules, misbehavior, mischief, stubbornness, willfulness, violation, punishment, and reward. These concepts constitute a loose system with which teachers think about classroom behavior. If a pupil breaks a rule, his misbehavior may be attributed to willfulness. In this system, such behavior is typically corrected by punishment such as denying priveleges or the use of physical coercion.

The second kind of conceptual network is taxonomic. In a strict sense a taxonomy is an ordering of phenomena by laws or principles. Plants and animals are arranged into phyla, species, etc., consonant with the theory of evolution. Diseases are classified in ways that facilitate diagnosis and treatment. No taxonomic system in education is as clear-cut as that in biology or medicine, nor are the principles of classification as law-like. But Bloom's taxonomy of objectives approximates the sort of order found in other fields, the objectives being arranged roughly according to the order of complexity and development.

To return to concepts of classroom management and control, is there a taxonomic example? A number of attempts have been made to classify discipline problems. Perhaps the most thorough effort is that of Kooi and Schultz. Using the principles and techniques of factor analysis they classified deviant acts into five classes: physical aggression, peer affinity, attention seeking, challenge of authority, and critical dissention. If these categories are dependable, they can reduce the multiplicity of deviant acts to manageable categories. Only by viewing a

given act as one of a kind can the teacher diagnose the discipline cases in his class. If he were to attend to each as a unique case the cognitive burden would be overwhelming. But once there is a dependable taxonomy of discipline cases, skills for dealing with each type can be worked out and teachers can be trained to perform the skills appropriate to it. But the point of this analysis is that a taxonomy of disruptive behavior affords a basis for selecting concepts for which protocols can be developed. A number of protocols can be worked out for each of these five concepts, assuming them to be dependable, making it possible to teach prospective teachers to recognize a particular case as one of a kind.

The third conceptual network is one that makes possible the form-ulation of laws or law-like statements. This is a nomothetic system. An example is reinforcement theory. Among the concepts that make up this theory are operant and respondent behavior, operant conditioning, respondent conditioning, extinction, positive reinforcer, generalization, primary reinforcement, secondary reinforcement and shaping. These concepts hang together in a theoretical network. By reference to operant behavior, positive and negative reinforcers, shaping, and so on, it is possible to formulate laws or law-like statements about how to change behavior. The following is an illustration: If reinforcers are withheld; a response already learned becomes extinct. Applied to discipline problems, this law means that disruptive behavior becomes extinct if it is not reinforced.

A nomothetic network has some advantages over the other two as a source of concepts. For one thing, its concepts more readily issue into "what to do,"--which leads into skills. For another, it reduces the burden of diagnosis. In reinforcement theory, for example, the system places emphasis upon two situations--those in which the behavior is to be reinforced and those where reinforcement is to be withheld. But even so,

there is need for protocols to develop the ability to recognize kinds of behavior, types or reinforcers and so on.

To sum up, the selection of concepts entails at least two decision points: categories in which concepts are to be selected and particular concepts to be selected. To make these decisions the protocol developer must consider not only his resources, interests, and abilities, but also the importance of the concepts in the teacher's work. The significance of a concept is dependent upon the effectiveness of the network to which it belongs no less than the impact upon his work of the teacher's failure to understand a situation. As a rule, the common-sense network is less effective--it yields fewer skills that can result in desirable ends--than do taxonomic or nomothetic systems.

This pattern of concept selection rules out the notion that an efficient mode of protocol development is to select a recording of behavior already made, usually for another purpose, and then to search for concepts to interpret it. Instead of this approach, the developer should begin with clearly understood concepts and then develop situations that call out the behavior consistent with the concepts. To do otherwise is to resort to the loose and rambling approaches that characterize so much educational work at the practical level.

THE ANALYSIS OF CONCEPTS

Once concepts have been decided upon, the developer of protocols must analyze them. Otherwise he will not know what to depict in recordings of behavior. This is perhaps the most crucial task that the developer will face, for how well he performs it will largely determine the quality of his protocols. How does one go about analyzing a concept? It is an abstraction and can neither be pointed to nor taken apart as a

specimen in a laboratory.

To analyze a concept is to find out what is designated by the name of the concept. If the analysis is to be useful in developing protocols, it must be pushed to the level of observables. The analysis cannot be left at the level of such abstractions as conditions, states, and other forms of being. Motivation, for example, cannot be defined as an incentive, and yet be useful in developing protocols. The analysis must be pursued until the objects or events encompassed by the concept are identified, and the attributes characterizing it are identified. Perhaps the first step in reducing the concept to observable is to express it in a linguistic form. The concept is thus reduced to a set of verbal meanings that can guide the search for the observable embraced by the concept.

Not all concepts are of the same order, and different definitional forms are necessary to account for the variety of concepts that can be portrayed in protocol materials. For the purpose of developing protocols, it is suggested that concepts be expressed in one of four possible forms: (1) classification form, (2) equivalent-expression form, (3) open-context form, and (4) conditional form.

The classification form of a definition provides for a concept to be associated with a category and to be distinguished from other concepts by discriminating criteria. For instance, a teacher behavior such as explaining, can be set apart from other teacher behaviors such as defining by establishing the criteria that are necessarily present when explaining is going on. The distinguishing element for explaining would include the criterion that the teacher is always trying to account for a given effect. Additional qualifying criteria that are necessary to distinguish explaining from defining would be added until the limits of explaining are drawn.

In the equivalent-expression form a concept is set forth by providing an expression that is equivalent to the word or words used to name that

concept. A series of qualifying criteria, such as those used in the classification form, cannot be developed for relational concepts such as intelligence quotient. The concept of intelligence quotient can be expressed by using the equivalent-expression form and calling it the ratio of mental age to chronological age times 100. One could then say in regard to an intelligence test, "A converted score on the test is an intelligence quotient," is equivalent to saying, "A converted score on the test is the ratio of mental age to chronological age times 100."

The open-context form provides a means of expressing concepts whose definitions are imprecise because the boundaries of the terms are not rigidly limited. When the limits of a term cannot be determined, it is a temptation to avoid the definition and to consider the term undefinable. Sovereignity, freedom, democracy and happiness are examples of loose terms that cannot be reduced to an equivalent-expression form or to a classification form without finding exceptions to the definition or restricting the definition to unreasonable limits. In these cases, it is preferable to include the defining characteristics in the open-context form. A definition in this form may be stated as follows: Happiness is characterized by smiling, being physically relaxed, expressing contentment with physical and social surroundings, describing the future with positive anticipation, etc.

The interpretation of behavior may vary according to the conditions that precede that behavior. In such instances the conditions are a part of the definition of a term, and the conditional form is appropriate. If an individual is breathing heavily and perspiring, the interpretation of his behavior depends on the conditions preceding the behavior. If the individual has just completed vigorous activity in a physical education

class, or if the individual is about to attend a difficult examination whose results are critical, we may label the same behavior--breathing heavily and perspiring--as fatigue or anxiety, according to the conditions accompanying the event. Some concepts can only be expressed within the context of the conditions in which they occur.

The definition of a term is undertaken to ascribe certain meanings to the concept and to get others to use the concept with the same meanings. It is the task of the developer of protocols to choose the words that express the concept and then utilize the appropriate linguistic form to sharpen his definition. When comparing the initial written definition with a given linguistic form, it is likely that modification of the initial statement will become necessary. The linguistic form that is most appropriate will depend on the nature of the concept and it is only through writing the features and characteristics of a concept that the appropriate form becomes known. One should express concepts in the most precise linguistic form, but completeness and accuracy should n. be sacrificed. The overriding concern in a definition is the clarity with which the concept is analyzed and the clarity with which that analysis is communicated to others.

As an example of the use of definitions in developing protocols let us look again at classroom management and control. Suppose that in the taxonomic scheme of Kooi and Schultz[2] the protocol developer wishes to prepare protocols on attention seeking as a form of disruptive be- havior. What does hr do? The first thing perhaps is to review the literature for characteristics of attention-seeking behavior. He will doubtless find that this form of disruption is expressed in a number of ways such as asking silly questions and making silly remarks. These are attributes of behavior which the developer may express in a definition.

He may begin by supposing that a classificatory definition is appropriate, and define "attention seeking" as an emotional state in which the individual makes wisecracks, silly remarks, and unnecessary and unusual noises.

But he will encounter troubles with this form. For one thing, what is an emotional state? Is it a class of things for which distinct instances can be identified? Or is it a construct that carries little or no freight? For another thing, there are other acts such as seizing and hiding property of others that may indicate attention seeking. How many additional acts can be identified is difficult to forecast. Furthermore, attention seeking is clearly not a relation concept, and, hence, not likely to fit into the equivalent-expression form. Nor do there appear to be accompanying conditions that vary the behavior and limit its interpretation, as in the case of frustration. So, it looks as if an open-context definition might be appropriate. It can be stated as follows: Attention seeking is characterized by making unnecessary and unusual noises, wisecracks, and silly remarks; asking silly questions, making funny faces, etc. The definition is now open for additional attributes, and the abstract expression "emotional state" which serves no purpose is no longer in the picture.

A verbal analysis of a concept is not the same thing as an empirical analysis. If it were, the development of protocols would be relatively simple. As indicated above, the developer must pursue the analysis to a behavioral situation that exemplifies the concept. After he has attained a fair degree of verbal clarity, his task is then to contrive a situation that elicits the behavior called for by his definition. At this point, his difficulty will center on the question of how to tell whether or not the behavior actually called out by the situation exemplifies the attributes which the definition specifies.

This point becomes clear when it is recognized that an attribute—silly question, taking other's property, etc.—always occurs in a context of many other acts that can, and typically do, blur the distinctiveness of the attributes in question. The distracting acts may be so noisy that an untrained observer cannot tell which act is the attribute. He observes so many things happening concurrently that he may become confused and observe all sorts of irrelevant happenings and make all sorts of interpretations of the protocol. To increase the pedagogical utility of the protocol the developer must control the number of variables in a given situation. This calls for simple situations that clearly depict the relevant attributes or the use of pointers in the protocol to indicate the attributes, or both.

Moreover, it may be difficult to tell whether or not the attribute is genui e. For instance, a student may make a silly utterance without intending to do so and is not thereby seeking attention. How is the developer of the protocol to tell? Of course, if he stages the situation, the question hardly arises. But an independent observer will not know the circumstances, as the developer does, and can assess the student's motives only from the behavior. If he cannot tell whether or not the remark just happened to be silly, he is hardly in a position to interpret the behavior. What cues must the developer build into the protocol to avoid this sort of quandry? The answer will vary from one protocol situation to another, but in general there must be enough disruptive behavior for the observer to form a network of observations that make possible inferential connections from one act to another.

In summary, the breakdown of a concept into its constituent parts comprises three operations: a verbal step that leads to the formulation of a definition of the concept, a substantive analysis that consists in

the reduction of the definition to a behavioral situation, and a further

step that consists in the identification of attributes that represent the

concept. These are interrelated operations and the order of their per-

formance can vary from one protocol to another.

THE UTILITY OF CONCEPTS

The utility of concepts is less important in the development of pro-

tocols than in the use of protocols in teacher education. For this

reason, the various uses of concepts should be treated and illustrated in

the guide to the use of protocols. To understand the use of concepts is

to understand the purposes they can serve. Only if the teacher educator

is aware of these purposes can he show the significance of concepts to the

prospective teacher or to the teacher in service. From such a demonstration

of utility the teacher in training can learn to appreciate as well as

understand the role of educational theory in his work.

What then are the uses of concepts? First of all, concepts are used

to tell whether or not a given event, object, act, etc., is one of a kind.

In an elementary sense this is what is meant by interpretation or diagnosis.

If one encounters a strange event or act, or one which resembles others so

closely that it is difficult to tell which it is, he knows what it is when

he can classify it. As soon as he sees that it is one of this or that kind

of thing, he has diagnosed what it is. He can then be said to have inter-

preted it; or if the event, act, condition, etc., is abnormal, we say he

has diagnosed it if he tells what kind it is. The process of classifying

is one of the ways, perhaps the chief way, in which the unknown is assimi-

lated to the known. Without concepts this process would not occur.

To recur to the theme of classroom management and control, suppose that a student throws an object and subsequently wanders around the room. How are these actions to be understood? They could be indications of either attention seeking or critical dissention. The teacher will not understand these acts correctly unless he is able to classify them correctly. If these actions are associated with others that are clearly in the category of attention seeking, the teacher is apt to be correct if he classifies these actions in that category also. On the other hand, they are apt to be signs of critical dissention if they occur in a context of other acts that clearly belong to this particular class. In any event, the teacher understands behavior by classifying it, and the accuracy of his categorizing will determine the correctness of his understanding, and p cly the adequacy of the subsequent treatment.

Another use of concepts is to <u>guide</u> the formulation and choice of means and ends. The teacher is constantly trying to maneuver from one situation to another, and the maneuver entails means-ends relationships; that is, actions designed to attain a particular end. Such an action is a complex operation consisting of four elements: an end, means, conditions, and norms. The end is a state of affairs toward which the action is intended to alter. The means are those aspects of the conditions over which the teacher has control and which he incorporates in the action. In any situation there is always more than one means available. From among these alternatives the teacher must choose, and his choice will necessarily entail, at least implicitly, the use of norms. This analysis characterizes in general the framework in which a teacher operates from moment to moment. In actual fact he typically is not aware of this framework of decision making. Events occur too rapidly and vanish too quickly for the teacher to make such an analysis. But if he has a dependable conceptual system that has become

second nature to him, he will make appropriate decisions almost automat-
ically when they are needed. Reduced to its lowest terms, the teacher's
behavior takes the simple form: perceive x, do y to get z.

To recur to the theme of classroom management and control, the teacher
may interpret the conditions in which he finds himself as one in which the
disruptive behavior stems from the pupil's need for recognition. The end
is then conceptualized as a state of affairs in which the pupil's need of
attention is being satisfied. To move from one of these states to another
the teacher can choose among a number of means. His choices will entail
the use, at least implicitly, of norms or value concepts. For example, he
can put the disruptive pupil in a leadership role in a group situation, or
ask him to make a special report to the class, or to do any number of other
things that add to his status in the class. The choice of means will depend
not only upon his ability to see alternatives and his understanding of the
characteristics of the pupil, but also upon his view of the relative worth
of the alternative means in the educative process.

The third use of concepts, foreshadowed in the preceding paragraphs,
is to make predictions. Predictions are more easily made and with more
security with concepts that hang together as a system, for a system facili-
tates logical deduction which is basic to predictions. In its most primitive
form, a system of concepts consists in tenuous psychological associations.
Cold war, red, Russia, radical, and communism are associated psychologically.
To think of one is to call up another: red suggests radical, radical suggests
communism, communism suggests Russia, and Russia suggests cold war. There is
no inherent order of these associations and no logical connection among
these terms. Thought moves from one term to another not by deduction but
simply by one term calling up another by association. The closer the concepts
of education come to this type of associative system the more worthless they

are as a basis for valid inference and prediction. Serious educational

thought does not rest upon mere association of ideas. But under the pressure

of classroom events for quick decisions the teacher's thinking may regress to

that level more often than is generally believed. To safeguard decision

making in the classroom against this sort of associative thinking is one of

the purposes of teacher preparation based on the use of protocol materials.

More significantly concepts are related to one another logically. As

noted earlier, the logical relations may be loose, as in traditional wisdom

where the terms are apt to be vague and ambiguous. But in taxonomic systems

the logical relations can be more rigorous, and even more so in a nomothetic

system. In these system inferences are more apt to be valid. If X is

platinum it can be dissolved by putting it in aqua regia. Latinum as a

substance bears the material relation dissolves in to the substance aqua

regia. But with far more care than can be taken here, the concept of plat-

inum can also be related logically to the concept of aqua regia so that the

proposition: platinum dissolves in aqua regia can be derived. By the same

token, if a student is an attention seeker, his conduct becomes constructive

by satisfying his need for attention. Here attention seeking and recognition

are related in ways contrary 'common sense. According to traditional

wisdom, the attention seeker would be punished for his disruptive conduct

instead of being ingratiated by giving him a prestigeous task to perform.

ISSUES ABOUT THE DEVELOPMENT AND USE OF PROTOCOLS

Certain issues about the development and use of protocols have arisen

from time to time. Some of these should be considered because the way they

are resolved will affect either the use or the nature c protocols, or both.

Some developers as well as users of protocols insist that protocols must be used inductively in the teaching of concepts. They would have a protocol presented to students who would in turn arrive at the appropriate concept by induction from the events exhibited in the protocol itself. Others hold the view that the instruction should be didactic; that the important thing is that the concept be learned. Advocates of the didactic approach hold that even simple protocols are so complex that the student is likely to spend an undue amount of time and deal with many irrelevant matters without direct guidance by an instructor. They would have the instructor set the stage by indicating the concept to be learned and then analyzing it. The protocol would then be viewed and the student and teachers would discuss the interpretation of it, noting the attributes and how they are identified. Naturally there are variations of these two approaches, but on the whole the foregoing description covers the essentials of each approach at the operational level.

This issue may turn out to be false. For one thing, neither research nor theory lends support to the sort of naive distinctions ordinarily made between heuristics and didactics. There is reason to suppose that these two approaches to learning, if they are distinct, are complementary. There is little evidence to support the view that search alone leads to discovery. Had Aristotle tried all of his life to construct an airplane, he would in all probability have failed. The bits of knowledge necessary to the invention were simply not in his culture. When the knowledge instrumental to a discovery is not known by the searcher, discovery is unlikely. Furthermore, the searcher may not know the procedures to follow in making the discovery. The searcher

is then likely to fail also. The learner who possesses the requisite knowledge and procedures is more often the one who succeeds. Whether these are acquired didactically or heuristically apparently makes no difference. For another thing, the research evidence on the relative effects of these two approaches upon student achievement lends no weight to the view that either one is superior to the other.

A number of issues have to do with the development of protocols. One of these pushes the issue of didactics and heuristics into the production phase. A few developers insist that protocols can be developed effectively by first recording behavior and then searching for a concept to interpret it. Other developers insist with equal conviction that one should know first all of the concept to be learned and then contrive protocols to teach that concept. Assuming two protocols of equal merit, one developed inductively and the other deductively, could an observer tell how each was developed? It would seem unlikely that anyone could tell the difference. The issue boils down in part to the question of which is the most efficient way to develop protocols, and in part to the question of whether protocols inductively developed can be equal in merit to those developed deductively. Finally, it should be pointed out that ultimately protocols must be developed to cover a catalog of concepts. This task will require systematic planning, and it is questionable that the

behavior and what the concept specifies. Insistent demands for real life
situations are perennial. The question is not "How real is the situation?"
It is whether or not an observer can tell a staged protocol from a real life
protocol. This is an empirical question. But it is likely that the distin-
ction would be so blurred that an observer could not tell the difference.
Furthermore, the main question is whether or not the protocol facilitates
the acquisition of the appropriate concept. If staged protocols do, this
subordinate issue would have little to commend it as a point of discussion.

One of the pressing issues concerns the criteria for the selection of
concepts. Some aspects of this question have been dealt with in earlier
paragraphs. The point of emphasis here is how closely a concept should be
by inference to skills. It was noted earlier that some concepts imply skills
of teaching, at least weakly. For example, the concept of reinforcement has
direct implication for teaching behavior. On the other hand, upper social
class, as a concept, has such feeble implications, if any at all, that one
is not clear what teaching behavior can be inferred from it. Some developers
hold that only concepts that imply skills should be selected for protocol
development while others take the opposite view, contending that such a
criterion is too restrictive.

In considering this issue it should be remembered that skills do not
exhaust the repertoire of learnings that a teacher uses. He has attitudes
toward his pupils, his content field, himself, or what have you. How a
teacher classifies his student, himself, or his subject helps to shape his
attitudes. If he classifies a student who is constantly unruly as incipiently
sick, his attitude toward the student will be different from what it would be
were he to classify him as criminally inclined or downright mean. Furthermore,
a teacher's self concept will affect his use of skills, although it implies

no skills. Protocols can be developed for teaching concepts that affect

attitudes just as easily as they can be developed as a prelude to skills.

Both are important.

THE PORTRAYAL OF CONCEPTS: AN ISSUE IN THE DEVELOPMENT

OF PROTOCOL MATERIALS

The purpose of this paper is to develop and clarify the topic of con-
cept portrayal as it applies to the production of protocol materials. It
is not our purpose to delineate the nature of protocol materials here, but
a few words about that concept seem to be in order, simply to place our
discussion in an appropriate context. A protocol is essentially the por-
trayal of a concept. In the present case, such a concept would be perti-
nent to teacher education, either a concept about the subject matter the
teacher deals with, or a concept about teaching itself. Furthermore, the
portrayal of a concept means something other than a dictionary definition
of the label given to the concept. For our purpose, the portrayal involves
laying out, through a series of episodes, the one or more characteristics
that, together, exemplify the concept to be portrayed. If, for example,
one were going to develop a protocol of the concept <u>positive reinforcement</u>
as part of a psychological foundations component of teacher education, all
the elements that are critical to the concept would have to be portrayed
in the finished protocol. Thus, we would want scenes or dialogues that

---

illustrate the following events and sequences: (a) the occurrences of the responses, (b) the rewarding or reinforcing stimuli which follow the responses, (c) repetition of elements (a) and (b), (d) switching to scenes which recreate events highly similar to those in (a), and (e) switching to responses similar to those in (a). Of course, one or even all of these stages might have to be repeated in the development of the protocol. That would be a matter of judgment regarding the didactic, or teaching demands of the protocol. Similarly, the portrayal sketched above would probably not exhaust the meanings of the concept "positive reinforcement". There probably never comes a point beyond which an abstract concept cannot be further developed. Even with these disclaimers, the sequence of events above, if they were fulfilled with clear and appropriate examples of the elements or subconcepts indicated, would provide at least a first approximation to the idea of the portrayal of a concept. Although there are other factors that enter into the ultimate success of a protocol, conceptual issues are a central consideration, and a first consideration. There is probably no time during the development of a protocol that conceptual issues can be ignored. The educational value of what emerges, through whatever medium the developer finally settles upon, cannot exceed the quality of conceptualization that has gone into it, no matter how fine the technical production may be.

What kinds of outcomes emerge from analysis of concepts that are of use to protocol developers? There seem to be three broad topics in the conceptual realm that developers must work with in producing protocol materials. These are: (a) analytic issues, (b) didactic issues, and (c) outcomes.

Before we turn to .these issues, let us introduce a few terms that might be widely adopted for discussions about protocols as a problem in concept analysis and concept teaching. Psychologists have reported so many studies of concept learning over the past fifty years that the literature abounds with multiple terms for similar references. Throughout this paper a small set of "middle of the road" terms are used to speak about concepts; terms that do. not commit us to any particular systematic position. Thus, an example of a concept is simply a concrete representation of behavior which has a given label associated with it. An example might be a brief bit of classroom interaction in which the teacher reacts in a given way to some response from a student. Our example may be either positive (meaning that it is a case of the concept we wish to portray), or negative (meaning that in one or more aspects the example does not portray the concept). Concepts may have multiple dimensions. To have. a positive example of a concept would require that all the requisite dimensions of the concept be portrayed. To illustrate, when teachers "accept" some behavior from a student, we would ordinarily anticipate that two dimensions of the concept must be involved. One of these is a dimension of rating on the part of the teacher. The other would typically be a dimension of responding by the pupil.

To avoid confusion at this point, let us try two simple examples. Here is a positive example of "teacher accepting reaction".

P: The angles of a triangle add up to 180 degrees.

T: Good for you! That's exactly right!

*****

The above example is positive because the pupil has clearly responded

in his behavior, and the teacher reacts with a <u>rating</u>. The following example is negative for "teacher accepting reaction".

P: How do you solve Problem 8?

T: I know you'll find a way. You're a good student.

. *****

Although the teacher's reaction is generally constructive and encouraging, it does not imply acceptance of the student's behavior. Neither is the statement by the student a response. If these distinctions sound minimal, remember that one of the purposes in producing protocols is to remove conceptual ambiguity that often intrudes into discussions of classroom behavior.

A final term we will use for talking about concept examples is <u>value</u>. Most dimensions of concepts can have more than a single value. One way in which values of a dimension can differ is in the form of behavior involved; for example, verbal versus non-verbal. Let us rec nsider the first positive example above in an altered context.

The scene is a junior high school mathematics class.

A boy working at the board computes the magnitude of

each angle of a   angle. He then writes on the board

· '180 degrees'. The teacher smiles, touches the boy

lightly on the shoulder, and nods his head.

Those terms may be usefu. in thinking about the concepts to be portrayed in protocols. What the dimensions, and what their values, is a question to be answered through analysis of the specific content or concept to be portrayed.

Let us more fully elaborate the three major questions of the dis-

cussion: (a) analytic issues (b) didactic issues, and (c) outcomes.
Analytic issues are those that one confronts when he moves from the
point of having identified a concept to be translated into a protocol
to the point of considering the range and types of behavior to be cap-
tured in order to fully and fairly portray it. Key analytic questions
are the specifications of the dimensions and values of the concept.
Subordinate but very time-consuming and demanding questions concern
the properties of examples, both positive and negative. The purpose
of this phase of conceptual analysis has nothing directly to do with
efforts to make the protocol teachable. Its purpose, rather, is to
make the best possible effort to insure that the classes of examples
to be searched for will represent the concept comprehensively and ex-
haustively.

Didactic issues, on the other hand, are those that compel us to
grapple with questions of the complexity of our examples, sequencing
of examples, manipulating the range of discriminations the learner
must make, definitions, and descriptions of the concept to be taught.
If this phase of the conceptual development is well done, it should
eventuate in a comprehensive identification of the scenes or episodes
that must be produced, or selected from film, or otherwise generated
to construct the finished protocol. It cannot, of cours , specify pre-
cisely the number of episc es of each kind that will be required, but
beyond that, when this stage has been completed, most of the questions
about needed episodes should be answerable.

Decisions about the outcomes for learners will be instrumental in
determining the graduated complexity of the episodes that compose the
protocol. Outcomes for protocols could be set at any number of levels,

but ordinarily there would be two chief ones. They might represent an intermediate and a final level for any protocol, or the developer might choose to shoot for only one or the other. At one level, the learner's task is simply to identify examples of the concept. In effect, an example is given, and if the learner correctly identifies it as a positive example, the task has been learned. Clearly, this is not a single level but many, and the criterial questions can range anywhere between requesting identification of a simple, clear positive example earlier seen and identified as such to new examples never seen before, with high background noise, in which fine discriminations are required from the learner, and so forth. However, in both cases, the developer is still in the position of clearly identifying the episode to be tested, and asking the question, "Is this X or isn't it?" We would undoubtedly have much greater confidence in the judgment coming from the second case than the first, but it is still a question of the structure being imposed by the developer.

A second level which, like the first, represents numerous sub-levels, is established when the learner views an extended segment of the film, or reads a lengthy passage of classroom transcript, or whatever it may be, and identifies and makes use of the concept or concepts of the program to analyze (interpret) what has transpired during that instructional interval. When the learner can perform at this level, there would be little question that he has an understanding of the meaning of relevant classroom behaviors at the conceptual level. This would seem to be a high level and desirable state of affairs that represents the objectives of the protocols program. It is an outcome distinctly different from an outcome of training, and it in no way warrants the ability of the learner to construct or to perform the behavior illustrated in the protocol. To the extent that we believe

teachers should be able to conceptualize and to analyze instructional

practice, such outcomes would seem to be of the first magnitude of im-

portance.

The Analysis of Concepts*

Analysis of a concept involves laying out the several component

parts that most concepts worthy of protocol development are likely to

have, identifying those parts, the conditions under which each occurs

or its correlates, the events that predictably follow it, or its con-

sequences, and a consideration of the relationships between or among

---

* Our discussion of the analysis of concepts undoubtedly contains many
assumptions, but there is one of which we are particularly aware, and
which must be explicated at the outset. There are numerous ways in
which concepts can be developed (produced, as contrasted with analyzed)
that are not considered in this paper. The principal reference through-
out is to empirical analyses of concepts. When one is in the process
of developing new concepts, as is often the case in basic research,
empirical analysis is not possible, or at any rate would contribute
very little to the investigator's purposes. The assumption being made
in this paper is that <u>the fundamental purpose of protocol materials</u>
(and the same would be true for training materials) <u>is to teach con-
cepts that are of sufficient importance to merit inclusion in programs
of teacher education</u>. One implication of that assumption is that most,
perhaps all, of the concepts selected for development in the national
protocols program will have been the object of considerable attention
by research workers or educational developers. On the one hand, this
should guarantee the protocol developer a body of empirical knowledge
to draw on for his purposes, and on the other, its absence may alert
him to question whether his concept is sufficiently well established
to compete in the conceptual marketplace with other more fully develop-
ed concepts in teacher education. Not all of the current programs
share this assumption. Probably alternative conceptual models will be
needed for those programs. The purpose in identifying the underlying
assumption here is to call attention to such differences and such needs,
and not to argue for the exclusion of what in some cases are excellent
and provocative materials. There are areas of knowledge in which the
concept of empirical analysis as used here is not very meaningful.
Teachers of literature, for example, may have a commonly held concep-
tion of the "psychological motivation of a character" which would suc-
cumb to analysis of a sort similar to what is called empirical analysis
in this paper.

the various components. Such analysis is one of the preliminary activities that the developer must undertak>, and it is a most challenging one. The orientation that pervades this analysis is not one of "how to portray" the concept, although perhaps no developer worthy of his keep can ever stray very far from that primary preoccupation Rather the concern during this phase is for the question, "What does the concept look like in : s'entirety?" This conceptual analysis is a blueprint from which the developer will build his protocol. If the analysis is faulty, he may wind up with a protocol that only partially portrays the concept, or which is inconsistent, or overlaps and can be confused with another concept.

To pursue the notion of the conceptual analysis as a blueprint, let us take a concept, attempt an analysis of it, and see what kind of a blueprint we arrive at when we have finished.

Empirical Study of the Concept

The concept we have chosen for arlysis is "teachers' accepting reactions." In general, the concept covers those situations where the teacher greets a statement by a pupil with an expression, gesture, or statement of his own that indicates approval, encouragement, praise, or some other positive reaction to the pupil's contribution to class interaction. It also includes cases in which the teacher must correct or disagree with some or all of the content of the child's remark, but at the same time communicates his unwillingness to reject the pupil's effort, and a desire to continue the encounter.

Once we have identifie the general domain in which the concept resides, we immediately begin to ask whether there is information abroad that will enable us to dimensionalize the concept in some productive

way, and to learn something about its occurrence and form in the real world of teaching that would be important to know as we undertake the development of a protocol. What kind of information would fulfill these functions?

Empirical studies of classroom behavior would seem to be a first domain to be examined, and within it, particularly systems that have attempted to analyze what the teacher does verbally or otherwise vis a vis the spoken language of children.

Although we shall be deeply involved here in a consideration of the work of Arno Bellack and his associates as it helps us to analyze the concept before us, we must make clear the more general point. Most concepts that are selected for protocol development are concepts that involve human behavior. In turn, such behavioral concepts ordinarily have been the subject of at least some empirical investigation in the past. One of the first productive steps the developer as analyst can take is to examine appropriate empirical sources for information about his concept. That examination can provide two kinds of information of a positive sort, and a third kind that may be negative. Of the first two, the developer can learn what the basic dimensions are of his concept, and something of the relative frequency with which the concept occurs in its various forms. Such information should have great implications fc· the relative emphasis ultimately reflected in the protocols that are later to be developed. As a derivative of the foregoing, the developer may also begin to form some hunches about the media he may choose for some or all of his work on a particular concept. For example, if empirical sources indicate that the key information about the concept is rarely communicated through intonation, voice inflection, or non-

verbal behavior, such as facial expressions and gestures, the developer might elect to avoid visual or audio media altogether. Conversely, his empirical data sources may also help him to decide that film is indispensible to his portrayal; that without it, the development of his concept must necessari'·· be restricted and incomplete.

On the negative side, categories developed for purposes of research are frequently abstract and, obviously, conceptual, as opposed to concrete and illustrative. Not only are they unlikely to be a good source of examples of the concept, which is a particular problem for the developer, but they are often not helpful in determining the boundary lines between var:~us values of the same dimension of a concept, or between dimensions themselves. This suggests that the developer frequently will need to engage in reliability studies similar to those the researcher conducts, as he begins to build libraries of examples of the concept.

To return once again to cases, this test of empirical sources works very well for the present concept. Although other inquiries could be consulted as well, the painstaking classroom study by Arno A. Bellack (1966) and his associates, reported in The language of the classroom, is an extremely informative and helpful source for purposes of the present analysis.

In the first place, the concept, teacher's accepting reactions, can be placed into a broader framework of concepts used to analyze teaching. An examination of Bellack's work reveals that classroom language is categorized into four kinds of moves, which are labelled structuring, soliciting, responding, and reacting. Almost 40 per cent of all moves that teachers make in the classroom are classified as reacting moves, and they account for about 45 per cent of the words

teachers speak (actually lines of transcript, which amounts to the same thing). These statistics are cited because they provide graphic support for the empirical importance of reacting moves as a tool in the teacher's repertoire.

Reacting moves turn out to be of several types, one of which is "rating". Rating reactions, in their turn, consist of some six types, which Bellack labels as "positive", "admitting", "repeating", "qualifying", "not admitting", and "negative". It is within the domain of rating moves that our concept of "teacher's accepting reactions" falls. Yet several of these types of ratings would seem to qualify as "accepting", and we shall have to proceed to clarify what is meant by each of them, to see whether we will ultimately need to incorporate more than a single class of examples or episodes to teach the concept of "teacher's accepting reactions".

The first four types have positive elements to them; i.e., "positive", "admitting", "repeating", and "qualifying". We would suppose, then, that for a reasonably full elaboration of the concept the developer would be required to include these four types, for each contributes some new dimension to the concept. This does not, of course, rule out the possibility that protocols would also be developed which depict the "not admitting" and "negative" forms, but the grounds for doing so would be didactic, not having to do with the analysis of the concept per se.

Further perusal of the data that have been obtained about teachers' rating behavior may pose a decision-making occasion for the developer. If "qualifying" ratings are considered to be negative, as Bellack construes them, then 80% of teacher ratings are positive. If "qualifying" moves, on the other hand, are construed as positive, as we have done

here, then accepting teacher ratings occur almost 93% of the time that teachers rate pupil behavior. Positive, admitting, and repeating each account for approximately 25% of the teacher's rating reactions. Qualifying ratings occur approximately 14% of the time.

Similarly, the developer needs to consider the circumstances under which the behavior occurs, or the occasions that call forth accepting type ratings by the teacher. Conceptually, there can be numerous of these. For example, either pauses in discourse, or some physical action can conceivably be the occasion for rating reactions. Indeed, these events do occur, but the frequency is so low (a combined 3%) that the developer would need to think carefully about including such protocols in his display, even though it can be argued that the concept will be incompletely portrayed without attention to such examples. In the same vein, reacting moves are occasioned or elicited by all four kinds of the moves that constitute the entire system of classroom language: structuring, soliciting, responding, and other reacting moves. However, two-thirds of reacting moves are occasioned by responding moves, and another one-fourth by other reacting moves. Less than eight per cent of reactions are preceded and called forth by structuring and soliciting moves. One further statistic: most of the time, a reacting move follows a single preceding move. More than one move precedes a reacting move in only 7% of the cases recorded by Bellack.

What does all this add up to? Does it tell the developer anything he needs and wants to know about the analysis of his concept, which in turn, will enable him to make a stronger portrayal of it as a protocol?

Reference to this single empirical source has, indeed, provided the developer with a wealth of valuable and specific information about his

concept. In the first place, it has suggested additional dimensions that must be incorporated into verbal definition of it, and which must also he portrayed, for full illustration of the concept.

The basic dimensions of "accepting reactions" are now seen to be "positive", "admitting", "repeating", and "qualifying". Each of these must be taught. Furthermore, the reaction of interest will almost always occur in a brief cycle that includes one move, followed by the reaction. The occasions when more than a single preceding move is involved are rare enough that we would probably not insist upon portrayal of them. In fact, they could represent a confusing element in portraying the concept. Similarly, although ratings occur in conjunction with all four kinds of basic moves, they follow responding and other rating moves with such high frequency that those sequential relationships must be portrayed.

An additional kind of information has been obtained, also, for use in the didactic phase of planning the protocol. That is, "negative" and "not admitting" behaviors represent negative examples of the concept to be portrayed, and such negative examples play a significant role in the process of teaching the concept.

Before we continue to that phase of the discussion, however, one important issue remains to be touched upon. Concepts may be analyzed in other than the empirical way that we have shown here, although we have tried to stress the significance of empirical analysis for protocol production. Nonetheless, there are concepts of great importance for teacher education that may have abundant empirical study and documentation in environments other than those which are most appropriate for teacher education. One such concept that comes to mind is the psychological concept of "positive reinforcement". There are few concepts in contemporary

behavioral science that have been more thoroughly analyzed and studied.

Yet there is not the classroom counterpart of the analysis of reinforcement that we have seen in the present case. It would seem patently foolish to suggest that reinforcement ought not to be portrayed as a protocol on those grounds, since at a guess, virtually all educational psychology courses incorporate, or might incorporate the concept, among their teachings. What sort of analysis would be productive in such a case?

Of course, one solution to this problem is for the developer to do precisely what we have done with "teacher's accepting reactions", and that is to make an empirical analysis of reinforcement as it appears in research literature. The resulting protocol might show laboratory animals, such as rats or pigeons, undergoing the shaping of instrumental responses, or it might recreate experimental situations for conditioning particular verbal behavior, motor responses, the treatment of stuttering, autistic behavior in children, or other situations in which intensive experimental studies of reinforcement have transpired. However, if the developer's purpose is to portray the concept in action in the classroom, an alternative kind of analysis must be undertaken. In such a case, he must take the basic components of the concept, which of course are well known, and begin to ask questions about their manifestation in classroom situations. From this analysis by analogy, some interesting observations should result. For one thing, the developer would probably succeed in being a great deal more concrete about the nature of classroom reinforcement than most textbooks or teacher education programs ever become. Secondly, we suspect he would conclude at some stage that the values of the concept manifest themselves differently in the classroom than in the Skinner

box, and his protocol would have to portray those differences.

A final comment in this analytical phase concerns the great potential for the improvement of our knowledge about teaching that can accrue from the development of protocol materials. One of the weaknesses of many concepts in teacher education besides their vagueness, is our lack of knowledge about their consequences. We know, for example, that in laboratory settings, reinforcement is defined in terms of its consequences, as a stimulus that increases the likelihood of recurrence of the response that it follows. If reinforcement is portrayed in the naturalistic setting of the classroom, we should have an ideal laboratory for observing its consequences in the complex social environment generated by a group of children and their teacher. The same ching can be said about "teacher's accepting reactions", and most of the other concepts that are being developed into protocols. The relatively small additional effort that would be required to study these effects would be compensated for by the manifold increases in knowledge and potential potency of teacher education that could ensue.

Didactic Issues in Protocol Development

We need a set of guiding principles to enable us to decide how our conceptual examples are to be placed in sequence, and whether supplementary materials are to be used, and how they can best be built into our teaching protocol. A simple set of principles, based upon some widely known and tested conceptions about learning and transfer, are suggested here. These principies are delineated with the assumption that we are talking about the teaching of a set of interrelated concepts, each of which has more than a single value of one dimension.

Recent writings of Smith (1967), Ausubel (1968), and Clark (1971)

contain certain parallel observations about the teaching of concepts.
Smith found, for ir tance, that in ongoing secondary school classrooms,
teachers and students develop strategies for concepts that call upon
three kinds of moves: the concept may be described, or it may be com-
pared with other concepts, or examples of it may be given. Of course,
some strategies combine moves of different types. Ausubel emphasi es
the importance of building clear, stable, unambiguous meanings in cog-
nitive structure. Clark makes some similar suggestions in his uses of
negative examples. in the teaching of concepts. The product of my think-
ing about these didactic issues, based largely upon the writings of the
three men identified here, is the following two principles and their
application to protocol production: -

1. The teaching of a concept should begin with clear, simple
   examples of its positive form, and move progressively through
   a series of stages that incorporate increasing stimulus com-
   plexity, and demand finer discriminations on the part of the
   learner.

2. A new, but related concept should be introduced only after
   the first concept has become clear, stable, and unambiguous
   • Points of tangency between the two concepts should be stressed
   in an effort to keep them discriminably different from each
   other.

These principles can be reformulated in more concrete terms that
begin to suggest a program of action for the developer.

1. Begin with one of the concepts to be taught. Define and des-
   cribe it; give the learner as many conceptual hooks as possible.

   a. Construct simple, clear positive examples of the concept.

b. Use prompts or cues as necessary to simplify the concept.

c. Label the concept.

d. Sample all relevant dimensions and values.

e. Provide for learner responding to each example, and for feedback to him about the correctness of his responses.

2. Shift to other examples of the same concept.

a. Remain with positive examples of the concept.

b. In this stage, gradually eliminate the prompts and cues.

c. With progressive examples, increase the stimulus complexity; include more irrelevant cues.

d. Continue to give the learner a chance to reveal the extent of his learning.

3. Select a second, related concept for presentation. Relative to the first concept, this should be the most similar of those remaining to be presented.

a. Again, make use of labeling, cues, prompts, and other devices to simplify the stimuli that the learner must respond to.

b. Use these, and the text of your examples, to emphasize and clarify the basic similarities and differences between the new concept and the old.

Figure 1 is a recapitulation in schematic form of the dimension of four stages of episode development that follows.

Decreasing
Discriminability

←

Stage 4

"Slice of Life" segment. (Only control is assurance that concept in positive form is embedded in film).

Stage 3

Positive and negative examples. (Increasing noise level). (Cues and labels are gradually faded from examples of both types).

Stage 2

Clear examples on film, (Brief positive examples, values of dimensions varied. Low noise). (Labels, other cues may be overlaid).

Stage 1

Printed definition written examples (Script allows firm control over extraneous stimuli and learner's attention).

Increasing Stimulus Complexity

Figure 1: A Schema for Presenting Concepts in Media

Stage 1

An accepting reaction by the teacher occurs when a response by a pupil, or a rating by a pupil, but usually a pupil response, is followed by a rating from the teacher that either clearly is positive, or less clearly admits the response, or which simply paraphrases or repeats the response, or which results in a qualification by the teacher.

We begin this protocol with the concept of positive rating. When the teacher gives a positive rating, which may be either verbal or non-verbal, no doubt is left that she unequivocally accepts the response (or rating) of the pupil. Although the behavior of interest typically occurs embedded in a complex sequence of classroom interaction, the positive rating is restricted to the pupil reaction (or rating) followed by the teacher's reaction.

An example of such a cycle is given here:

First grader: (reading haltingly) Ted---throws---the---ball.

Teacher: Good girl, Cathy!

As we have indicated, some or all of the exchange could be non-verbal. For example, with a minor alteration, we would have the following, still an example of positive rating.

First grader: (reading haltingly) Ted---throws---the---ball.

Teacher: (Smiles, nods).

Stage 2

In this stage, media is used to portray the examples. All examples are positive, and they should be relatively clear and simple. Part of the appropriate strategy is gradually to increase complexity and reduce discriminability during this stage. This can be done by (a) gradually reducing labels, cues, and prompts, and (b) introducing examples that

are not restricted simply to the essentia' of the concept being taught.

The following example, if appearing on film, would be a good introduction to Stage 2.

P: Andrew Johnson was impeached, he just wasn't convicted.

That is, the Senate decided he wasn't guilty.

T: Right on the head! That's a very good answer.

From a semantic standpoint, this example is no different from the one given for Stage 1. In fact, it is more complex because it occurs within the normal context of an ongr .ng classroom. The developer would be very careful in introducing this stage to label and cue the episode appropriately. He must, however, be equally careful in seeing to it. that by the close of this stage, the learne is independent in his ability to identify and state criteria for episodes of this or somewhat greater stimulus complexity. Obviously this means the developer must be at pains to insure that learners are responding to appropriate elements of the substance of episodes, and not just to the cues or labels supplied in the early teaching episodes.

Stage 3

The tradition to Stage 3 is signalled by the complete absence of overlaid cues for positive examples, and by the introduction of negative examples, as well as less concern about controlling the noise level, or irrelevant stimuli that appear on film. For instance, embedded within the action of Stage 3, we might have episodes similar to the two that follow.

P: Jerry said the Republicans won the election of 1912, but Wilson was a Democrat.

T: Yes, he was.

P: Another cause of unemployment is that--well, if a man doesn't have a job--you know--he can't buy anything, and then that hurts business.

T: Oh? Well, I see your point. OK.

The example on the lefthand side is unmistakably one of a positive rating because the teacher accepts the pupil's response unequivocally as correct. It lacks the enthusiastic modifiers (and presumably the intonation that signifies enthusiasm as we`) which have accompanied the earlier examples. The example on the right is not a positive rating; theref re, a negative example. `ally, it is intended to portray "admitting", in which the teacher's reaction, not positive, is mildly accepting or equivocally positive. When the negative examples call for initial subtle distinctions, cues may be provided, but they would be discontinued before the close of this stage. Stage 3 would not be complete until the learner can discriminate acceptable but less than totally clear examples of the concept to be learned from examples of other kinds of behavior that are similar to, but differ from the standard behavior on one or more dimensions.

At Stage 4, the learner should be capable of identifying any acceptable example of the concept as it appears in ongoing classroom behavior, even though it may be surrounded by negative examples and a high noise level, and using the concept to explain ongoing events. The developer's aim at this stage is to provide the student with as natural a slice of classroom life as he can capture. The only constraint under which he operates is that examples of the concept to be learned appear within the context of the film.

Summary

The purpose of this analysis has been to apply a simple theory of concept learning to the particular rigors of development involved in the production of protocol materials for teacher education. The theory says simply that the developer should begin the development process by, first, analyzing the concept he wishes to teach as carefully as he is able to do, and, as part of that process, lay out the partic 'ar dimensions and values of the concept that will need to be portrayed. From a practical point of view, the development of a library of appr priate examples is highly recommended. Examples may come either from existing materials, or may be constructed by the developer. They will tend to suggest to him in highly conc ete terms the range of examples that must be utilized in developing his final materials.

At the didactic stage of development, he begins with examples of the concept to be taught that are as clear and as unequivocal as can be found or produced. That simplicity is combined with simplicity in media, also, for example, printed text may be used in the initial development because it controls perfectly for all background noise. The development continues by presenting the learner with multiple examples of all the appropriate dimensions of the concept Ordinarily the developer's strategy in this regard would be to organize dimensions along a path of increasing stimulus complexity to heighten the possibility for positive transfer from one example or series of examples to the next.

At a more advanced stage, arbitrarily called here Stage 3, the developer not only generates extraneous noise in the background of his protocol; he also delit rately introduced non-examples, or negative examples of the concept. This is not done, in a tactical sense, until

there is good assurance that the learner has a firm understanding of the target concept in its range of dimensions and values. The introduction of negative examples at that time will help the learner to differentiate between the target concept and near relatives, as it were. If, however, negative examples are introduced too soon, the chances are good that the developer will create negative transfer instead of discrimination between concepts.

The final stage of this model is essentially a criterial one. The learner sees classroom behavior in all the richness and complexity that can be mustered on film, and identifies or selects examples of the target concept to help interpret or explain the events portrayed in the protocol.

Two final points must be made in the interests of clarity. One is that the stages described in this model are purely arbitrary, but have been imposed because they would seem to provide some helpful benchmarks for the developer. The other point is that the model described here will not and cannot provide data of the type and level required by the developer to make empirical decisions about the transition from one stage to the next. It should be clear that such data are needed throughout the developmental sequence, and would probably best be generated by the use of a small number of subjects who provide feedback to the developer, by viewing and responding to his preliminary efforts, about the number of episodes required, and how they should be articulated, one with another.

I have also suggested the need for alternative conceptual models to fit the case when the developer wishes to generate new concepts rather than to analyze and portray significant existing ones.

CUES AND MISCUES TO EFFECTIVE VISUALIZATION

·When we consider the visualization of ideas, I wonder how many

of us make assumptions based upon misconceptions about what happens

when we look at something, as well as what happens when we photograph

it. I wonder if you realize what contribution research has made to-

ward correcting some of those misconceptions. Although we generally

believe what we see, we don't truly see. Our vision is clouded by

visual noise, and distorted by our inner tendencies. It is governed

by what we have seen in the immediate past and conditioned by our

predilections and experiences. Our perceptive impressions in one

visual frame profoundly affect whether we overestimate or underesti-

mate the succeeding frame.

Perception is selective. In a sense we see what we want to see,

what is obvious or easy to see, or what we expect to see. Visual read-

iness is as real and as important as reading readiness. Perception is

organized. Apparently we tend to be orderly beings, and cluster inputs

into organized patterns. Strange as it may seem, although complexity

in visual images tends to interest the observer more, he will invari-

ably group his inputs so as to simplify his interpretation of

Wilfred Veenendaal is Associate Professor of Education and Assistant
Director for Instructional Development in Instructional Media Center,
Michigan State University. This paper was presented at the Protocol
Production Workshop at Michigan State University, East Lansing, Michigan.
October, 1971.

what he sees. There is a great tendency for the observer to put the
visual inputs into more readily digestible form, whether intellectually
or intuitively; to cluster the pieces to suit his ends.

We actually see what the artist calls positive and negative form,
or figure against (back) ground. Sometimes this distinction is dictated
by that which is being observed and is obvious, but more often it is
generated by the observer and unless cues are present will be quite
arbitrary. In a crowd of people, which become "figure" and which
"ground"? In a schoolroom scene, what is form and what is counter-
form (background)?

Do you realize that the human eye wanders over the perceptual
field? It doesn't focus on or come to rest at any particular spot in
that field, but properly guided it may consistently return to a desig-
nated focal point. In addition to complexity, people tend to be alerted
or attentive to novelty or change of pace and contrast, striking color
and shape. The se elements, while not as easily controllable in
documentary type recording, can be considered in production and
certainly should be taken into consideration in any planned viewing
and particularly in interpreting that viewing. They can be used to
direct the movement of the eyes.

Vision is of two types: pre-attentive and attentive. Pre-
attentive vision is peripheral and tends to be fuzzy and out of focus
but highly sensitive to contrast and movement. Attentive vision is
foveal, in the center of the perceptual field, and tends to bring images

into sharp focus. It is peripheral vision which often tends to attract

the attention of the viewer first and causes him then to direct his

vision to focus upon the new area. By exercising stimulus control in

the areas of brightness and movement, we can attempt to control the

viewer's attention and direct it to the visual images we think are

important.

Do you realize that contrary to the popular concept seeing is

not believing? Man tends to direct his attention and control his accept-

ance of what he perceives by deferring to his interests, experience,

and need. He relates what is new to what he already knows; he tends

to balance the novel with the familiar. In fact, he seems to be aided

in his perceptive experiences by discriminating between relative

extremes, by comparing the old with the new or the good with the bad.

Since we have good evidence that perception is relative--forcing the

observer to distinguish between the positive and negative, the "should"

and "should not"--the use of comparative examples probably is a good

learning strategy.

Do you realize that a picture, any picture, is an illusion? If

we accept the tenet that truth in vision is questionable, then certainly

a reproduction of that vision is even more questionable. For one thing,

we see three-dimensionally but almost all pictures are flat or two-

dimensional, whether still or motion. There have been attempts to

create the illusion of a third dimension by using a dual-plane format

in which one eye is forced to look at one plane and the other eye at a

second plane some distance behind the first. Most of these illusions have been failures or at best interesting novelties, and even the new holograph technique has not found a practical use in the instructional media field. Since observation in three dimensions is transformed into observation in two dimensions, it has to be an illusion. In fact, the illusion can be artificially created, enhanced, or exaggerated through the use of perspective. In addition, since neithe. vision nor the viewed area are static, we have both the element of depth and movement or time to contend with. Consequently, trained observation, repetition, or stop motion may be necessary to accurately decode that which is perceived.

In addition to the picture being an illusion, do you realize that the camera lies? Most of us have always assumed that anything we photograph is true and accurate. Unfortunately, experience and logic have convinced me otherwise. First of all, there are the mechanical limitations of the camera lens. Since it is compressing a very large observation area onto a very small picture plane, and then reconstituting the image on a large screen through a completely different set of lenses, there is a tremendous margin for error. We had this dramatically and annoyingly called to our attention several years ago when we tried to use single frames from 16 mm motion picture film as miniature slides. The quality and, more important, accuracy of the finished product was so poor that we had to abandon the project. In

fact, unless I am mistaken the prototype equipment which we brought in for the experiment is no longer made.

An extreme example of this type of aberration is the wide-angle lens, in which we compress the field of observation into a disproportionate pictorial product. Such specialized lens equipment has a purpose, but the distortion should be realized and taken into account when one interprets what he sees. In addition, as we adjust the focus of the camera lens we soften or sharpen images in the picture area at will, thus making for a type of selective viewing. Such focusing may be controlled to sharpen those images to which we wish to draw attention but more often are governed by the mechanical limitations of the camera, the film, or the amount of light available. Often, the quality of the camera lens gives us a distortion which we cannot control. This is sometimes true even with good cameras.

Taking these misconceptions into account, what can we do about it? First, I think there are three concepts in perception which are paramount to good visual interpretation. These are: (a) perception is relative, selective, and organized; (b) we have pre-attentive and attentive vision; and (c) all visual images are seen as figures against grounds. Taken in order, what implications does each have for us as we plan the production of protocol materials? In addition to these three perceptual concepts, there are three visual communication modalities which might prove useful: (a) spatial concepts can best be arrived at through the avenue of vision; (b) temporal concepts can best be arrived at

through the avenue of audition; and (c) space and time concepts

combined can best be arrived at through the avenue of both vision and

audition. I think the implications are obvious, but how do you see the

relationship between the perceptual concepts mentioned above and the

modalities? Can we set up some rules of thumb which might serve as

guides in our production work?

PROGRESSIVE EVALUATION OF PROTOCOL MATERIALS DEVELOPMENT

FOREWORD

"Progressive Evaluation of Protocol Materials Development" was originally prepared for use by protocol materials developers in a workshop at Michigan State University in October, 1971. The term "progressive evaluation" is used to describe the step-wise or progressive nature of evaluation iich occurs when development moves through successive phases. "Protocol materials" are instructional materials, usually employing audio tape, video tape or film, intended to illuminate a concept by showing instances to which the concept correctly applies. These instances typically involve the behaviors of children and adults as they appear in the classroom or in other community settings in which teachers might be expected to interpret behavior for purposes of education.

Because the workshop was intended to promote the critical examination and discussion of protocol development in small groups, the document presented here appeared as a linear program of questions which required the production of some form of evidence in response, thus facilitating group discussion. On subsequent pages, the linear format is maintained, but since the reader cannot discuss or critique the various points with the writer, notes are provided to illuminate those questions and requests for evidence which may not immediately be clear. To facilitate reading, each frame of the program appears on the left-hand page, and the notes pertinent to that frame appear on the page opposite. To perform the program realistically, the reader should get a concept significant to teaching in mind, begin at Start, then respond to each question with the appropriate type of evidence.

Richard L. Turner is Professor and Associate Dean for Research and Research Training in Education, Indiana University and member of the National Leadership Training Institute.

PROGRESSIVE EVALUATION OF

PROTOCOL DEVELOPMENT

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Persons Providing Evidence
Frame 1: The Concept	Start		
	What is the label (name) for the concept?	The label is _____	Project Director
	What are the criteria-in-mind- for the concept? How would I know when to apply this concept in a situation?	The criteria-in-mind are: (tell or show) 1.____ 2.____ 3.____ n.____	Project Director
	Can I sketch three situations in which the concept would be observed in (or induced from) someone's behavior?	The sketches are (1 paragraph each) 1.____ 2.____ 3.____	Project Director gives three. Producer gives different three.
Evaluation Decision #1 1. The concept probably can be represented; move ahead. 2. Concept not clear: reconsider evidence or return to start.			

Notes for Frame 1

The criteria-in-mind for a concept are those characteristics of things or processes which enable one to reliably identify them as belonging to a particular class. When the concept is considered "closed", the necessary and sufficient characteristics for a thing to be placed in the class are known. Thus, the necessary and sufficient characteristics of "reinforcement" are: 1) that it follows a response, and 2) that it increases the probability of the response it follows. An "open" concept is one for which the salient characteristics may be identified, but the necessary and sufficient characteristics to exhaustively define the meaning of it cannot be stated. Concepts labeled by such terms as "creativity", "ego", "anxiety", "democracy", may be viewed as open. Although the criteria-in-mind for closed concepts can usually be more easily stated than for open concepts, in both instances it is very important for the protocol developer to be able to sketch instances to which the concept correctly applies. When many instances can be sketched, the concept is usually well in mind, and, if the sketches are carefully thought through, instances which might be captured on film or tape become apparent to the developer.

For students to learn a concept well, negative instances of it, or situations which superficially look as if the concept correctly applies when it does not actually apply, are probably required. Thus, sketching negative instances may facilitate both protocol development and learning results among students.

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Persc.s Providing Evidence
Frame 2: The significance of the concept	How important is this concept? Can I name three texts in which the concept appears?	The texts and page references are: 1. _____ 2. _____ 3. _____	Project Director and associates
	What empirical evidence is there to support the importance of the concept to teaching?	The following scholarly papers investigated the concept: 1. _____ 2. _____ 3. _____	Project Director and associates
	Is this concept related theoretically to other concepts?	Here are the main concepts to which this concept is theoretically related. 1. _____ 2. _____ 3. _____ n. _____	Project Director and associates.

Evaluation Decision #2
1. The evidence for the importance of the concept is substantial; move ahead.

2. Peripheral concept; reconsider evidence or return to start.

Notes for Frame 2

In the social sciences many significant concepts cluster together within a theoretical system. Thus in Freudian psychology, anxiety and the attendant defense mechanisms are to be understood relative to other concepts such as id, superego and ego. In Skinnerian psychology, reinforcement, shaping, and extinction belong to a cluster, while Rogerian theory, self, threat, and anxiety cluster together. In social psychology task role, social role and leadership style cluster and must be carefully distinguished from each other. If the protocol developer is careful to observe such clusters, families of protocol materials may be developed.

A difficulty with many concepts in the social sciences is that they are wholly inferential entities or "constructs". A construct is not directly observable and cannot be instanced, although "indicators" of the construct may be instanced. Thus, ego processes cannot be directly instanced, but ego defense mechanisms, which are taken to be indicators of the presence of ego processes in Freudian theory, can be instanced.

Many social science concepts are of theoretical importance within a particular discipline, but may be of limited utility to a teacher in interpreting behavior and in subsequently taking some action with respect to that behavior. Thinking of situations in which a teacher might employ the concept one has in mind for a protocol provides a test of its practicality for teachers and helps one judge whether or not the concept is truly a significant one.

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Persons Providing Evidence
Frame 3: Learning Objectives	Exactly what learning outcomes am I seeking as consequence of using this protocol?	Here are the specifications for testing concept acquisition: 1. Target population 2. General test format 3. Cross-validity materials 4. Target level of performance 5. Required performance context	Project Director and/or evaluator
	Is the outcome limited to "concept acquisition"?		
	Is the outcome concept generalization and mastery?	Here are the specifications for testing concept mastery: (incorporate the above and elaborate on:) 1. Scope or diversity of cross-validity materials. What is the range of instances in which the concept is to be recognized? 2. Context and type of performance required to yield confidence that mastery has occurred	
	What is "Mastery" to mean?		

Evaluation Decision #3
1. I see exactly how to determine whether the learning outcomes I wanted have occurred.
2. I need help in getting my learning objectives clarified.

Notes for Frame 3

The difference between "concept acquisition" and "concept mastery" is viewed as one of degree. Concept acquisition implies that the learner can verbalize the characteristics which define the concept and/or recognize instances of the concept under controlled conditions and when a narrow range of possible instances are presented to him. Under these conditions, one may say that the learner has "acquired" the concept. Concept mastery implies that the learner can invariably recognize instances of the concept under a variety of simulated and real-life situations without special supporting cues or prompts.

In most instances protocol developers cannot provide appropriate conditions for completely testing concept mastery. What they can provide are cross-validity materials drawn from the total film or tape footage used to produce the protocol training materials. If one shoots two hours of film to develop a ten minute protocol on "probing" he should have, remaining in the footage, a large number of instances of probing as well as numerous instances of questions which might seem like probing but are actually negative instances. Editing these positive and negative instances into test films accompanied by appropriate instructions and response forms provides a means by which to evaluate the degree to which the learner has progressed toward mastery.

Evaluation
Decision Points
Criterial
Questions
Evidence for
Questions
Persons Providing
Evidence

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Persons Providing Evidence
Frame 4: The anticipated user	Precisely what "user" group do I have in mind?	Here are three courses (or modules) to which my protocol materials will be significant. 1. 2. 3.	Project Director and associates.
Evaluation Decision #4 1. I can meet my learning objectives in this length of time; move ahead. 2. I will need an extremely efficient package; take loop. 3. I think I am in trouble; take loop.	If the average course has 135 (3x45) class hrs. and 270 student study hours available, what proportion should be devoted to the concept in my protocol?	In checking with instructors, $\underline{X}$ hours were suggested for this concept. Or $X/405$ of their time, of which X_1 are class time and X_2 are student study hours.	Instructors or trainers
	Will designing package to incorporate principles of concept learning help?	To judge evidence see Hudgins' program loop.*	Project Director and producer; production experts
	Will careful selection of media and production techniques help?	Consult production expert	
Evaluation Decision #5 1. I can meet user requirements; move ahead to production. 2. I doubt that I can meet user requirements; return to start.			

*Hudgins, Bryce B. "The Portrayal of Concepts; An Issue in the Development of Protocol Materials," <u>Acquiring Teaching Competencies: Reports and Studies II</u>, Nat'l. Center for the Development of Training Materials in Teacher Education. School of Education, Indiana University.

Notes for Frame 4

A critical consideration in the design of protocol materials lies in their adaptability to different user needs. Some instructors may wish to use them in large groups, some in small, and others in individual study carrolls or by television. Some instructors will consider the concept highly significant in his or her instruction, others will consider the concept minor and wish to devote little time to it. Although each developer must develop his own design strategy for meeting diverse user needs, a good strategy is to assume that the materials will be subjected to the most stringent demands -- those in which the student is required to acquire or master the concept by individual study of self-administered materials. This strategy is a good one because it permits the instructor to retreat toward less structured approaches such as small group discussion if he wishes to do so. The opposite approach, providing little structure for the use of the materials, places the instructor in the position of having to develop his own materials if he wishes the student to acquire the concept by self instruction, and, by increasing the time investment of the instructor, decreases the probability of use.

For self-instructional use, massive quantities of written material are rarely functional. "Self-administered" may mean only that the student has contact with introductory material, can view or listen to the protocol, and can test himself on the testing films or tapes until adequate proficiency is achieved.

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Person Providing Evidence
Frame 5: Evaluation of Results	Have multiple equivalent forms of the main stimulus materials been prepared?	Here are: 1. An entry test, based on stimulus materials, which can be used to place or "pass out" advanced students. 2. A test of concept acquisition composed of materials different from the learning materials (cross-validation or generalization materials) 3. A test of concept mastery composed of complex stimuli from which the concept indicators must be discriminated (if learning objectives require concept mastery).	Project Director, producer, evaluator
	Have exact instructions for users been prepared?	Here are: 1. A kit which tells the user how to use the protocol package. 2. Directions will tell the user how to administer the tests in the package in order to obtain reliable results	

Evaluation Decision #6

1. The materials for appraising results are ready; move ahead.
2. The production design failed to yield the appropriate materials. Consider additional production or re-editing.

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Person Providing Evidence
Frame 5 cont.	Has sample of users been identified n>1	Here is the list of users for the field trial. 1. _____ 2. _____ 3. _____	Project Director, evaluator
	Are the students of the users in the target population specified under learning objectives?	Here are the major characteristics of the students _____	Evaluator
	Does the user have approximately the required performance context?	Here is a description of the performance context _____	Evaluator
Evaluation Decision #7 1. The user and context are congruent with learning objectives; move ahead. 2. The field situation is bad and should be dropped; a new set of users must be found.			
Evaluation Decision #8 1. Treatment and control subjects were randomly assigned; move ahead. 2. Assignment is bad; intact groups or single group design must be used; move ahead or get new user group.	Can the students of each user be divided into a treatment group (or groups) and controls?	Here is the method by which treatment and control subjects were assigned.	Evaluator

Evaluation Decision Points	Criterial Questions	Evidence for Questions	Persons Providing Evidence
Frame 5 cont.	Did the user follow the directions exactly?	Here is a list of departures from set procedures _____	Evaluator
	What were the results?	Here are the results: 1. User satisfaction. 2. Student satisfaction. 3. Proportion of students who had already acquired concept. 4. Time to criterion for treated students. 5. Differences between criterion performances: treatment vs. controls.	

Evaluation Decision #9
1. The package attains the objectives and seems efficient.
2. The package was partly successful: 1, 2, 3...
3. The package should be shelved, where did we go wrong?

122

Notes on Frame 5

The point of evaluation is to influence confidence in the value of some thing or process. Generally, confidence in value is increased as the number of empirical tests for value increases. Several types of empirical tests may be recognized with respect to protocol materials.

1. If the instructors and students report that the materials were satisfying and worthwhile, given the needs they wished to meet by using them, increased confidence in value occurs.

2. If students moved from a low level of mastery of the concept (say 20%) prior to using the materials to a high level of mastery (say 80%) following their use, confidence in value is increased, even though no comparative data (e.g., from a control group) are available. If most of the students had 80% mastery to begin with, confidence in the value of the materials is <u>decreased</u>, since they teach a concept students already know and are therefore redundant.

3. If randomly assigned students who are instructed by means of the materials significantly outperform a rando--, assigned control instructed by other methods for equal time, confidence is increased. Moreover, as the number of alternative methods of instruction to which the protocols are superior increases, confidence in the value of the protocols correspondingly increases. If the protocol materials are superior to other methods for teaching the same concept(s), but require greater instructional time, confidence in value is not increased.

4. As the number of different users who report satisfaction, increases in mastery, and comparative superiority for protocol materials increases, confidence in their value correspondingly increases.

A major point of failure in many evaluation efforts lies in inadequate procedures or in the in-adequate reporting of procedures. Most developers are very careful about their production procedures; equal care in the evaluation procedures will help insure a product in which full confidence can be invested.

GLOSSARY OF BASIC 16MM MOTION PICTURE PRODUCTION TERMS

A.B. CUTTING, A.B. PRINTING

A method of putting successive scenes on different rolls ("A" and "B" rolls) interspersed with leader to enable various effects, fades, dissolves, etc., to be done. If prints are made directly from these rolls, the technique is known as A.B. printing.

ACADEMY LEADER

A type of leader, standardized throughout the industry, which is placed at the head and tail of all reels of release prints. It contains information useful to the projectionist. Named after the Academy of Motion Picture Arts and Sciences.

ACTION

Movement occurring before the camera, or appearing on the film. A term often used to designate picture in contrast to sound in a reel of film.

"ACTION!"

The order indicating that the action within a shot is to begin. Given by the director of a film when the sound and/or picture cameras are running to speed.

ANGLE

The viewpoint from which a picture is composed or photographed.

ANIMATION

The bringing to apparent movement of inanimate objects set before the camera, by exposing one, two, or three frames, then moving the object before the next exposure. Among the objects set before the animation camera are cells, cutouts, and puppets.

ANIMATION CAMERA

The camera used for filming animation. It is usually mounted on an animation stand with its optical axis vertical, so that it looks down on the objects being photographed. The drive allows the film to move forward one frame at a time.

This information was distributed at the protocol production workshop, Michigan State University, East Lansing, Michigan, October, 1971.

ANSWER PRINT

A combined picture and sound print, in release form, of a finished film. It is a trial print and is usually studied carefully to determine whether further modifications are required prior to release printing.

ASSEMBLY

The putting together of the shots of a film into approximately the final order. (See also "Rough Cut" and "Fine Cut.")

A-WIND

Pertains to rolls of film, photographic or magnetic. When such rolls are oriented vertically with emulsion side of film lying toward the inside of the roll, and the perforated edge nearest the observer, the head, or outside end of the film will unroll downward from the right-hand side of the roll.

BARN DOORS

Hinged doors mounted on a studio lamp, which may be swung to block off light from an area where it is not wanted.

BATCH

The quantity of emulsion which is manufactured at any one time for the production of raw stock is substantially the same, and the stock on which it is coated is called a batch. Different batches, of film, however, may differ slightly.

BLIMP

The soundproof housing which surrounds a camera used to record dialogue, and which prevents the noise of the camera from being superimposed on the recorded dialogue. The term "self-blimped" is sometimes applied to cameras in which the normal housing silences the noise of the mechanism without the addition of an external blimp.

BOOM, CAMERA

A mobile camera mount, usually of large size, on which the camera and operators may be projected out over the set and/or raised above it. Provision is made for counterbalancing, raising and lowering, rotating, and bodily moving the boom, these motions being effected either by electrical motors or by hand.

BOOM, MICROPHONE

A support incorporating a telescoping pole arrangement for suspending and manipulating the microphone in order to obtain its optimum orientation and position outside the camera's field of view.

BREAKDOWN, FILM

The process of separating and sorting the individual scenes and takes in a single roll of film.

BREAKDOWN, SCRIPT

Analysis of a script according to actors, locations, etc.

BROAD

A rectangular floor light for flat lighting.

B-WIND

Pertains to rolls of film photographic or magnetic. When such rolls are oriented vertically with the emulsion side of the film lying toward the inside of the roll, and the perforated edge nearest the observer, the head, or outside end of the film will unroll downward from the left-hand side of the roll.

CAMERA ANGLE

The point of view from which the camera surveys the subject. For a "high angle" the camera looks down on the subject; for a "low angle" the camera is directed upward toward the subject from a position lower than that occupied by the subject.

CAMERA, MOTION PICTURE - TYPES --

Field Camera

A camera adapted primarily to shooting exterior scenes with a small production unit, where portability is of first importance.

Studio Camera

A massive camera designed for studio use, fully silenced and carrying every refinement needed for complicated shooting.

CAMERA MOVEMENT

Movement of the camera as a whole (i.e. not pivotal movement on its horizontal or vertical axes) while shooting a scene.

CAMERA TRACKS

Tracks of wood or metal laid down to carry a dolly or camera boom in order to insure smoothness of camera movement.

CELL (Also "CEL")

One of the transparent pieces of cellulose acetate used in cell animation. It contains two or more holes or slots which mount on pins under the animation camera to obtain perfect registration.

CELL ANIMATION

Animation by means of drawings or paintings on transparent material (cells), designed to be photographed successively, each cell advancing the apparent motion by an appropriate increment.

CELL (Title)

Title lettering painted or printed on clear acetate in order to place lettering over a suitable background.

CEMENT

The solvent used in joining two pieces of film to form a splice.

CHANGE FOCUS

(See "Follow Focus")

CHANGING BAG

Light-tight cloth bag with armlets in which film may be changed in the open.

CHARTS (Animation Program)

A chart which gives the camera operator frame by frame instruction as to cell movement, direction, zoom movement, and length of takes.

CHEAT

To arrange articles or subjects arbitrarily in front of the camera so that when photographed they will appear natural, when the normal placement of subjects would result in an unnatural appearance.

CHECKERBOARD EDITING

A popular method of two-roll conforming where the scenes are alternated between the two rolls with the invervening space filled with black leader. This method (or other multi-roll conforming systems) is essential if dissolves and invisible splices are desired in the composite prints (used synonymously with A and B roll editing).

CINCH MARKS

Scratches on film caused by the presence of dust or other abrasive particles between successive coils on a roll. Relative movement of adjacent coils results in a scratch mark on either or both sides of the film. Longitudinal cinch marks may result if the center of a roll of film is rigidly held while the outside end is pulled tight.

CLAPPER BOARD (Clapstick)

A device consisting of two short boards hinged together at one end so that the boards can be slapped smartly together and "bounced" apart, thus providing, in double-system recording, a visible cue point in the picture and a corre- sponding audible and visible cue in the sound track, from which it is relatively easy to establish synchronism in editing. Clapsticks are often combined with a slate for visual identification of scene.

CODE NUMBERS

Identical numbers printed, prior to the editorial process, along the edges of synchronized positive picture and sound tracks, thus in effect providing sync marks at intervals of one foot from the start of the reel. A number of laboratories, however, use the term edge numbers. To be carefully distinguished from NEGATIVE NUMBERS.

CODING

Any system of marking two or more films with a series of sequential numbers for the purpose of maintaining an established synchronous relationship. (see "Code Numbers," "Edge Number")

COLOR CORRECTION

1. Alteration of tonal values of colored objects or images by the use of light filters either with camera or printer.
2. Lens design which corrects chromatic aberration.

COLOR TEMPERATURE

A concept formulated for the purpose of reference and standardization of color of light sources. When a so-called "black body" is heated to the point where it begins to emit light as a source with an essentially continuous spectrum, the color of the light it emits varies systematically with the temperature of the black body, when the temperature is expressed in degrees centigrade beginning at absolute zero (the Kelvin scale).

COMPOSITE (Print)

A single piece of film bearing both picture and matching sound. The sound may be set up in any of the standard synchronous relationships to the picture.

COMPOSITION

Arrangement of objects of a scene according to the principles of art.

CONFORMING

The act of matching the original film to the edited work print. This is done by using a synchronizer to maintain precise matching of the original to the work print.

CONSOLE

A control panel, used for sound recording and re-recording, which enables the input from one or more microphones or dubbers to be varied in respect of amplitude and frequency pass band. It also makes provision for the mixer to monitor the signal at the console output. Re-recording consoles are often of impressive appearance and carry 50 or more controls.

CONTACT PRINTING

Contact printing is that method of printing in which the raw stock is held in intimate contact with the film bearing the image to be copied.

CONTINUITY

Professional script or scenario as ready for production, which describes the business and action of the consecutive scenes for the guidance of the director.

CONTINUITY CUTTING

A style of cutting marked by its emphasis on maintaining the continuous and seemingly uninterrupted flow of action in a story, as if this action were being observed by the audience as spectator. Contrasted with dynamic cutting.

CORE

Cores are centers, usually made of plastic, upon which motion picture film is wound. It is customary to store developed original film in rolls on cores, rather than wound on reels.

A

117

CONTRAST

Lighting Contrast

The ratio between the maximum and minimum intensities of incident light on the subject, or radiated and/or reflected light from the subject.

Photographic Contrast

In terms of negative or positive film, the ration between the optically most dense and least dense areas.

Subject Contrast

The scale of tonal values exhibited by a subject. If the scale is short, with little range of tone, it is called "flat," whether generally dark or generally light. If the subject tonal scale is reasonably long, with good gradation from black to white, it is regarded as normal. When the subject tonal range is great, and intermediate tones are relatively lacking, the subject is termed "contrasty."

COUNTER (Footage)

A mechanism on certain types of motion picture equipment that counts feet and frames of film.

CRANE

A large camera boom.

CREDITS

Titles of acknowledgement for story, sets, direction, etc.

CUEING

In "voice-over" or other post-recording situations, the marking of the cueprint in a way which will permit a signal to be given to the narrator to begin each portion of narration at the appropriate time. Also, the use of any such signal.

CUEPRINT

A positive projection print bearing the cues for post-recording.

CUE TRACK

Usually a single system track used to find sound sync, when a wild double system recording is made. Very valuable when slating the takes is impossible or impractical.

CUT

1. An instantaneous transition from any shot to the immediately succeeding shot which results from splicing the two shots together. The cut, a simple and timeless occurrence, is at the root of many of the creative powers of the film, and is primarily responsible for its ability to construct a new framework of time and space. 2. To stop operation of camera and/or sound recording equipment. 3. To edit, assemble or join together lengths of film.

CUTAWAY

1. A shot inserted to interrupt the continuous flow of another shot, such as a reaction face shot. A time-bridging device. 2. An insert shot of subordinate action occurring at the same time as the main action.

CUTBACK

A scene that is a repetition of, or continuation of, previous action that has not been shown on the screen for some time.

CUT-IN

The insertion of a shot to enhance the action of a longer shot, such as a close-up.

CUTTING

The creative process by which the film editor (cutter) arranges photographic and sound recording materials into a completed film. Synonomous with editing.

DAILIES

The prints delivered daily from the laboratory of original film shot on the preceding day, Also called "rushes."

DEAD

An acoustical characteristic of an enclosed space in which reverberation is reduced to an objectionably low level.

DEFINITION

Sharpness or clearness with which images are defined by a lens.

DENSITY

In its common photographic connotation, the logarithm of the opacity of developed photographic film, the most convenient term in which to express the light-stopping characterisitc of the film.

DEPTH OF FIELD

The range of object distances before a camera within which objects are in satisfactorily sharp focus, the limits being the production of a circle of confusion of greatest acceptable size.

DEPTH OF FOCUS

The range through which the image plane (the emulsion surface of the film) can be moved backward and forward with respect to the camera lens, while continuing to render an image of acceptably sharp focus. The term depth of focus is often erroneously used when depth of field is meant.

DEVELOPMENT

Development is the process of treating an exposed photographic emulsion to make the latent image visible. Note: This term is sometimes incorrectly used in the trade to include both fixation and washing of the developed image and drying of the film. The correct term for these operations as a group is processing.

DIALOGUE

Words spoken by the actors in a scene.

DIALOGUE TRACK

Sound track which contains the dialogue only.

DIFFUSER

1. A screen used to soften artificial or natural light. 2. A lens accessory used to reduce image sharpness over part or all of the field.

DIRECTIONAL

Applied to certain optical and acoustic devices like screens, loudspeakers, exposure meters and microphones, this term denotes a limitation of the angle of reflection, radiation or acceptance.

DIRECTOR

The individual who interprets, in terms of cinematic technique, the specifications outlined in the shooting script, and supervises all phases of the work involved in achieving from it a coherent unified film presentation.

DISSOLVE

A transitional effect in which one scene fades out at the same time that a second scene fades in. Also called "Lap Dissolves" and in England "Mixes."

DISTORTION

Audio

Any discrepancy in signal wave form or phase between the input and the output of an electrical amplification or transmission system, or the introduction, by the system, of spurious frequencies.

Optical

Any systematic malformation of any image, due to characteristics of the optical system by which the image is formed. Most photographic lenses are adequately corrected in manufacture for the common optical distortions.

DOCUMENTARY

A type of film marked by its interpretative handling of realistic subjects and backgrounds. Sometimes the term is applied so widely as to include all films which appear more realistic than conventional commercial pictures; sometimes so narrowly that only short films with a spoken narration and a background of real life are included.

DOLLY

1. A wheeled mount for a camera, used for moving the camera while making a shot, and for moving a camera from place to place on a set. 2. To move the camera by means of a dolly while shooting a scene.

DOLLYING

Movement of the whole camera when making a shot. Sometimes referred to as trucking or tracking.

DOUBLE EXPOSURE

Successive exposure of a light-sensitive emulsion to two scenes, so that two super-imposed images are visible after development. When more than two images are exposed on the same emulsion as in some types of animation, the term multiple exposure is used.

DOUBLE SYSTEM

An arrangement whereby picture and sound are recorded on separate strips of film with the provision that the picture and sound can be matched synchronously throughout their length in the editing process.

DUBBING

1. Synchronization with the lip movements of an actor of a voice not originally recorded in synchronism with the picture track. The voice may or may not be that of the original actor, and it may or may not be in the same language. Dubbing is usually accomplished by means of loops, consisting of short sections of the dialogue in composite print form, while the actors are guide by playback. Dubbing is used to record songs and prepare foreign versions of films. 2. Same as Re-recording.

DUPE NEGATIVE

A dupe (duplicate) negative is a negative film that is produced by printing from a positive. From the dupe negative a larger number of positive release prints may be made. In color it is generally referred to as internegative.

DUPE PRINTING

A dupe print is a reversal which is printed from an original and processed to obtain a positive image. Dupe is a contraction of duplicate.

DYNAMIC EDITING (Cutting)

A term used in film aesthetics to mean a type of cutting which, by the juxta-position of contrasting shots or sequences, generates ideas in the mind of the spectator which were not latent in any of the syntherizing elements of the film. Dynamic editing procedures have been popularized by the Russian film-makers.

EDGE FOG

Undesirable random exposure along the edge of a length of film. Often caused near either end of the roll by insufficient shielding in loading or unloading daylight-type spools of film, by an insufficiently light-tight camera magazine, or by improper storage or handling of film while it is still in the photo-sensitive state.

EDGE NUMBER

One of a series of sequential numbers, spaced one foot apart for convenience in positional identification, exposed by the manufacturer onto the edge of raw film stock. The latent images of these numbers then develop up during processing, and can be transferred under proper conditions in printing, to duplicates. Also, one of a series of sequential numbers inked or printed in turn, from a common starting point, on the edge of first the original film, then in the same sequence and spacing on duplicates.

EDITING

The process of assembling, arranging and trimming film, both picture and sound, to the best advantage for the purpose at hand. Same as "Cutting."

EDITING ROOM (Cutting Room)

A room where the editing or cutting of films is carried out.

EDITOR

The person who is responsible for assembling the raw material of a film into a coherent and compelling whole. He progresses gradually from an assembly to a rough cut and then to a fine cut, usually in 16mm production, also doing all of his own splicing of work print and original. He may assign the preparation of music and sound effects tracks to a sound cutter.

EDITORIAL PROCESS

Editorial process is the term used to describe the combining, and other preparation of materials obtained from the original material to make the finished motion picture.

EDITORIAL SYNCHRONISM

The relationship between the picture and sound film during the editorial process. During the editorial process, the sound track and corresponding picture whether on the same or separate films, are kept in alignment and are not offset, as for projection. Thus, cutting a picture and sound can be a simultaneous operation.

EDITORIAL SYNC MARK

Designation on the head leaders of all picture and sound rolls meaning that the sound and picture rolls are in a side by side relationship.

EFFECTS (Optical)

Any shot that causes a unique effect on the screen. This includes matte shots, montage, titles and some 91 miscellaneous lap dissolves and wipes.

EFFECTS (Sound)

All sound aside from music and speech in the film.

EFFECTS TRACK

The sound track that contains all sound effects.

EMULSION

The coating consisting of gelatin and silver salts (unprocessed film) or gelatin and metallic silver (processed film) bonded to and supported by the film base.

EMULSION NUMBER

A manufacturer's designation for the identification of film type and batch or lot.

EMULSION SPEED

The photosensitivity of an emulsion usually expressed as an index number based on the film manufacturer's recommendations for the use of the film under typical conditions of exposure and development.

END SLATE

Identification slate that is placed on the end of a scene for convenience or due to error.

END SYNC MARKS

Synchronizing marks placed at the ends of reels of sound and picture film, usually to enable printing to be effected in both directions. End sync marks can also be usefully applied to re-recording sound tracks.

END TITLE

A title at the end of the film to indicate its completion.

EQUALIZER

In sound recording, a component of an electronic circuit arranged so as to permit systematic alteration of the frequency response of the circuit, usually with the idea of providing optimum balance between low and high frequencies of the sound being recorded.

EXPOSURE

The process of subjecting a photographic film to any given intensity of light in such a manner that it may produce a latent image on the emulsion. According to the reciprocity law, exposure is determined by the product of time and intensity of illumination.

EXPOSURE INDEX

A manufacturer's numerical designation for film indicating emulsion speed and latitude within specific conditions of use.

EXPOSURE METER

Any of several types of optical or photoelectric equipment designed to assess reflected or incident light quantitatively. Most are equipped with an adjustable computer into which the several pertinent values can be inserted, and from which the exposure required for a specific scene can be read.

EXTERIOR

Scene taken outside a building. Usually anything taken outside the studio, although exterior sets are not uncommonly built in the studio. "On exteriors" means working outside the studio.

FADE

An optical effect occupying a single shot, in which the shot gradually disappears into blackness (fade out) or appears out of blackness (fade in).

FALSE START

A small strip of film in which the camera was started but had to be stopped immediately because of some technical difficulty.

FAST MOTION

At standard projection rate, any action which takes place on the screen at a rate more rapid than the rate at which the real action took place before the camera. This occurs when the camera is operated at a frame repetition rate lower than standard, but the projection frame repetition rate is maintained at standard. See "Slow Motion."

FILL LIGHT

The light which builds up shadow illumination. The ratio of KEY LIGHT to FILL LIGHT establishes in general terms the lighting contrast of a scene.

FILM BASE

Film base is the transparent or nearly transparent material upon which a photographic emulsion is coated; namely, the support for the emulsion in photographic film.

FILM CANS

Metal containers of various sizes in which motion picture film is protected from fire, moisture, dust, etc.

FILM LOADER

The member of a camera team whose function is to lead unexposed film into magazines and unload exposed film into cans. Except in a very large unit, the functions of loader are discharged by an assistant cameraman.

FILTER

1. An optical element used to absorb selectively specific components of light. 2. A component of an electrical transmission system, designed to pass certain frequencies and impede the passage of other frequencies.

FILTER FACTOR

A number designating the increase in exposure necessary when a filter is added to an optical system. Compensation can be effected in either of two ways: by increasing exposure time by an amount indicated by the filter factor, or by opening the diaphragm an amount sufficient to compensate for the filter's absorption.

FINE CUT

The version of the work print of a film which follows the rough cut stage in the film's progress toward completion. At each successive stage, the cutting is refined and unnecessary footage eliminated.

FLAG

A miniature gobo, made of phywood or of cloth mounted on a metal frame and usually set on a stand. See also "Scrim."

FLARE

Areas in a film emulsion exposed in some way other than through the usual image - forming properties of lenses. Internal reflections between the various surfaces of lens components, particularly if direct light or intense specular reflections strike the front element, often are the cause of serious flare. Leaky camera turrets, doors, or magazines are sometimes guilty, occasionally displaying this fault only when operated under strong sunlight.

FLASH FRAMES

The short length of film at head or tail of a scene which is over-exposed during the camera's period of acceleration in starting or deceleration in stopping.

FLAT LIGHT

Even lighting of subject without marked contrast, such as highlights or modeling.

FLUTTER (Sound)

The term "flutter" relates to any deviation of frequency which results, in general, from irregular motion in the recording, duplication, or reproduction of a tone, or from deformation of the record. The term "wow" is colloquial and usually refers to deviation of frequency occurring at a relatively low rate, as for example, a "once a revolution" speed variation of phonograph turntables.

F-NUMBER (See F-Stop)

FOCAL LENGTH

The constant of a lens upon which the size of the image depends. In a thin lens, it is the distance from the center of the lens to either principal focus. The equivalent focal length of a thick lens is the focal length of a thin lens of identical magnifying power.

FOCUS

To attain the maximum definition of image possible with a lens through adjustment of its optical relationship to the plane in which the image is formed.

FOLLOW FOCUS

A continuous change in camera focusing necessitated by relative movement between the camera and its subject, greater than can be accommodated by depth of field. Following focus is usually a function of the first assistant cameraman.

FOOTAGE

In the U.S. and some other counties, length of motion picture film is usually expressed in the English system, with the foot as the basic unit. Width, or gauge, of film, however, is universally expressed in the metric system.

FOOTAGE COUNTER

Attachment placed on motion picture equipment which records the number of feet of film that have passed through it.

FORESHORTENING

Exaggeration of distances, and consequently, the apparent dimensions of objects in the field of view in the direction of the optical axis of a lens. Long focal length lenses, with their narrow field of view, appear to compress distances along the optical axis; short focal length lenses appear to expand such distances.

FRAME

1. One individual picture on a strip of motion picture film. 2. To adjust the picture frame in projection so that it coincides with the aperture of the projector.

FRAME LINE

The horizontal line by which a single frame is separated from an adjacent frame on a strip of film.

FREEZING

If the cutter desires to lengthen a shot, he may arrange for a single frame (usually close to but not at the end) to be printed over and over again in the optical printer to make up the required footage. This is called freezing frames. To reduce the perception of graininess, it is better to repeat a cycle of three frames, but this is only possible if there are three successive frames without appreciable motion.

FRICTION HEAD

A type of panning and tilting head set on a tripod or other camera support which incorporates a smoothly sliding friction device to secure smoothness of camera movement.

F-STOP

A number expressing the ratio between the focal length of a lens and the diameter of its aperture. Due to variations of optical efficiency, two lenses set at the same f-stop may pass appreciably different amounts of light. (see "T-stops.")

GAFFER

In studio parlance, the chief electrician who is responsible, under the first cameraman, for the lighting of sets.

GOBO

Any sheet of opaque material used to prevent direct light from falling on a camera lens or a part of a scene.

GRAININESS

The character of a photographic image when, under normal viewing conditions, it appears to be made up of distinguishable particles, or grains. This is due to the grouping together, or "clumping" of the individual silver grains, which are by themselves far too small to be perceived under normal viewing conditions.

GRIP

The person who, on the studio set, has charge of minor adjustments and repairs to props, camera tracks and the like.

GROUND GLASS

A piece of glass with a finely ground surface on which an image can be formed. Used in the viewfinders of cameras, and the image is often enlarged by means of a focusing microscope.

GYRO HEAD

A camera mount for use on a tripod or other support, in which camera movement both in azimuth and in elevation is stabilized by means of a connection through a gear train to a heavy fly-wheel, with the result that jerkiness of movement is effectively damped.

HEAD

The beginning of a film. Film wound with the first frame of the presentation sequence on the outside of the roll is designated as "heads-out."

HEAD, CAMERA

The revolving and tilting mount on which a camera is fixed, and which in turn is fixed to a tripod, high hat, dolly, velocilator, or boom.

HEAD LEADER

In cutting film, a length of yellow or white leader stock which is spliced to the roll of film. Identification and synchronization start marks are written on this leader.

HEAD SYNC

Punch or mark in the head leader of "A" roll, "B" roll, magnetic or optical tra   and work print. The punches are aligned in the synchronizer and are us   s the standard start point for all operations.

HIGH HAT.

A very small tripod of fixed height which can be attached to the floor for low angle shots.

HIGH-KEY LIGHTING

When the key light forms a very large proportion of the total illumination of the set, resulting in a low lighting contrast and an effect of general brilliance in the scene. Still the recommended method for color shooting.

HOT

Too much light on a subject. Over-exposed.

HOT SPLICER

A film splicing machine, usually of precision construction, in which the metallic members in contact with the overlapped portions of the film splice are warmed by means of an electrical resistance unit. Thus warmed, the action of the film cement is hastened without apparent deleterious effect.

HYPERFOCAL DISTANCE

The distance at and beyond which objects in the action field are acceptably sharp when the lens is focused at infinity.

INCIDENT LIGHT

The light, from all external souces, which falls upon a subject under consideration.

INKY-DINK

A popular term for miniature incandescent lamp, usually 250W. Its main use is as an eyelight, being a spotlight, not a fill.

INTERIOR

Any motion picture scene representing an enclosed space. Any scene supposed to be taken inside a building.

INTERLOCK

Any arrangement permitting the presentation of picture and matching sound synchronously from separate films. The simplest consists of a mechanical link connecting projector and sound reproducer, both being driven by a common synchronous drive. Another involves the use of a separate synchronous motor for each film drive, with no mechanical link. Electrically inter-connected Selsyn drives are also used for this purpose.

INTERNEGATIVE

In color film, a corrected duplicate color negative on special film stock used to make many prints.

INVISIBLE SPLICING

A method of splicing 16mm original, using A & B rolls, placing the splices so that they fall in the black leader and are not printed.

JUMP CUT

Any film cut causing an abrupt break in time or continuity.

KEY LIGHT

The main light used for the illumination of a particular subject. See high-key lighting, low-key lighting.

LABORATORY

Place where films are processed and printed.

LAP DISSOLVE

See "Dissolve."

LATITUDE

Range of exposure within which a photographic emulsion will produce a satisfactory picture.

LEADER

Blank film at beginning and end of a reel or roll of film.

LENS

A photographic lens consists of a piece or series of pieces, called elements, of transparent substance bounded by two curved surfaces, or by a curved surface and a plane. Lenses used in cinematography are converging lenses which form a real image on the emulsion of a film or on a projection screen.

LENS HOOD

Tube or box designed to protect the lens from light not needed to form the image, such as strong side lights or direct sunlight.

LENS, LONG-FOCUS

A relative term describing lenses of longer focal length than normal, and consequently giving greater than normal magnification. See "Telephoto Lens."

LENS, NORMAL-FOCUS

16mm camera - 1 inch
35mm camera - 2 inch

LENS, SHORT-FOCUS

A relative term describing lenses of shorter focal length than normal, consequently giving lower than normal magnification and a wider field of view. Also called WIDE-ANGLE LENS.

LIGHT METER

See "Exposure Meter."

LIGHTING

1. Back Lighting: lighting the subject from the side opposite the camera to provide a limning effect which helps to separate the subject from the background. 2. Cross Lighting: lighting from an angle approaching perpendicularity with the lens axis. Used for modeling and to emphasize texture. 3. Fill Lighting: lighting used to illuminate shadow areas resulting from the main, or key, light source. 4. Front Lighting: lighting on the subject coming from near the camera. 5. Key Lighting: lighting on the subject received from the main, or dominant light source. 6. Kicker: lighting from behind the subject, and to one side. 7. Highlighting: lighting to emphasize the central point of interest of a scene. 8. Top-lighting: light resulting from sources mounted above the subject and shining down onto it.

LIP SYNC

The relationship of sound and picture that exists when the movements of speech are perceived to coincide with the sounds of speech.

LIVE

An acoustical characteristic of an enclosed space in which reverberation occurs to a noticeable degree.

LOCATION

Any suitable place away from the studio which may be used as a scene background.

LOG

A step-by-step record of the activities of making a motion picture. Separate logs are usually kept for camera and sound recording activities.

LOOP

1. A slack section of film designed to provide play when film is being fed from a continuously moving sprocket to an intermittently moving mechanism. 2. A continuous band of film spliced head-to-tails which passes through a projector or film reproducer in order to repeat a piece of action or sound over and over again. LOOPS are used for instructional purposes, as guide tracks for dubbing, and as convenient vehicles for continuous sound effects in re-recording.

LOW-KEY LIGHTING

When the key light forms, in comparison with high-key lighting, a lower proportion of a smaller total illumination. The result is that many objects. are allowed to fall into semi-darkness or even total blackness, thus throwing others into correspondingly stronger relief. This more dramatic style of lighting, which has now won general acceptance for certain types of commercial films and is advancing even in color photography, makes greater demands on emulsion characteristics and on processing techniques than does high-key lighting.

MAGAZINE

A container for film, usually embodying a film transport mechanism, designed to supply or present film for controlled exposure, and to re-roll the film after exposure. Most magazines are built to integrate with specific film-handling machinery, with the drive mechanisms mechanically coupled. Used with some cameras, some types of printers, or sound recorders.

MAGNETIC FILM

35mm or 16mm acetate film stock coated with an iron oxide emulsion and either single perforated (in 16mm) or double perforated. This film is used to record all sound elements. This film can be handled, cut and spliced the same as picture.

MAGNETIC MASTER TRACK

A final, satisfactory sound track that has been mixed from all the recorded sound elements. This track must be transferred to an optical track before an optical sound composite print can be made.

MAGNETIC RECORDER

As opposed to optical recorder. A "sound camera" which can play-back the sound track immediately upon recording, without development.

MAGNETIC RECORDING

A method of recording sound by impressing on a magnetic strip, film, or wire, a succession of magnetic patterns representing the sequential wave patterns of the sound being recorded.

MAGNETIC STRIPING

A method of placing a thin strip of iron oxide on the film to enable sound to be recorded on it by magnetic means.

MAGNETIC TRACK SPLICING TAPE

A single sprocketed self-adhesive plastic tape (usually opaque) used to butt splice magnetic tracks so that the splices are silent as they pass over the playback head of the recorder.

MAIN TITLES (Credit Titles)

The section of the completed film which contains the trade-mark, the title of the film, the case, and the production credits.

MAKE-UP

Theatrical greasepaint and accessories used to beautify or alter the features of actors.

MARRIED PRINT

A term used in England to denote a composite print.

MASK

A device used to block or limit the passage of light from one area while admitting whole or reduced illumination to another area.

MASTER POSITIVE

A positive film with special photographic characteristics making it suitable for acting as a master from which a series of dupe negatives can be printed with minimum loss of quality.

MASTER SCENE

In scriptwriting, the practice of indicating action only in terms of major sequences. The shot breakdown is then left to the director.

MATCHING

The editorial process of cutting from one angle to another so as to match the action at the cut, e.g. in long shot a man has hands above his head, cut to closer angle, the man has hands above his head.

MATTE

A matte is a light modulator which consists of an obstruction to the passage of light on its way to form a photographic image. Thus mattes are not essentially different from masks, but the former term is applied more often to the camera, the latter to the color printer and the optical printer.

MATTE BOX

A box mounted in front of a camera lens and designed to hold camera mattes as well as filters. The matte box is usually combined with a sunshade.

MATTE ROLLS (TRAVELING MASKS)

Matte rolls (traveling masks) are a pair of film rolls used as light modulators. Note: Matte rolls are complementary in that where one roll is clear, the other is effectively opaque. They are usually matched to rolls of original black and white, or of color reversal positives in the printing of black and white or color duplicates.

MATTE SHOT

(Traveling matte) film which is run through a film printer together with the film to be printed in order to mask a portion of it, and prevent that portion from printing. The traveling matte process is used to mask an area which does not remain static but moves and changes with the rest of the picture.

MICROPHONE SHADOW

The shadow which may be cast by a microphone onto some object in the field of view of the camera. "Mike" shadows must be eliminated before shooting can begin by altering the position of the microphone, the camera, or the lights.

MIKEMAN

Usual term for the operator who controls the physical movement of the microphone in the studio or on location, either by means of a boom or a pole.

MINIATURE

Set built to scale and magnified by the camera to natural proportions; sometimes painted on glass. Used in conjunction with trick photography in making scenes that would otherwise be prohibitive on account of expense.

MIX

To combine sound from two or more sources into a single recording, usually with adjustment of tonal quality and/or relative volume level.

MIXER

1. The senior member of a sound recording crew, who is in charge of the balance and control of the dialogue, music or sound effects to be recorded.
2. The person who supervises re-recording and mixing of sound.

MIXING

The process of combining a number of separate sound tracks into a single track. See RE-RECORDING.

MIXING PANEL

Control panel for sound mixing operations.

MONTAGE

1. In American usage, a series of shots designed to convey a general impression, usually a transitional theme, such as passage of time and events. Shots may be connected by optical effects, and may or may not include double exposures or special effects. 2. In Russian usage, simply the juxtaposition of shots resulting from editing.

M.O.S.

"Mit-out sound." A term commonly used in the motion picture industry to refer to film shot without synchronous sound recording, or to the activities incident to the shooting of such film. Said to have arisen from a mispronunciation of "without sound," by German directors and technicians working in Hollywood, in the late 1920's and early '30's.

MOVIOLA

The trade name for a machine for viewing film in small size and/or listening to the sound track. Loosely applied to all machines used for this purpose.

MULTIPLE CAMERA SYSTEM

The process of photographing a scene with two or more cameras at the same time.

MULTIPLE EXPOSURE

See "Double Exposure."

MUSIC EDITOR

The person responsible for editing all film music.

MUSIC LIBRARY

An indexed catalogued selection of background and music recorded. Note: It is usually an original sound negative, but may be a library negative.

MUSIC TIMING

The process of converting footage into seconds in order to aid the composer in timing his music.

MUSIC TRACK

The sound track which contains music.

NARRATION

A sound track voice, other than the pictured actors, which describes the pictorial action.

NARRATOR

An offstage or background voice.

NEGATIVE (SEE NEGATIVE IMAGE)

The term NEGATIVE is used to designate any of the following:
(a) raw stock specifically designed for negative images;
(b) the negative image;
(c) negative raw stock which has been exposed, but has not been processed;
(d) film bearing a negative image which has been processed.

NEGATIVE CUTTING (MATCHING)

The cutting of the original negative of a film to match the edited positive, shot by shot and frame by frame. The large footage to be catalogued, the necessity for exact correspondence of frame with frame, and the irreplaceability of the negative, impose very exacting conditions on negative cutters. Note: In 16mm productions the original camera film is usually a reversal film rendering a positive black and white or color image on processing. Thus the term "original: is usually used, with its meaning corresponding to that of the term, "negative."

NEGATIVE IMAGE

A negative image is a photographic image in which the values of light and shade of the original photographed subject are represented in inverse order. A negative color image is usually understood to mean an image in complementary colors, from which an image in the original colors can be printed.

N.G.

A colloqualism for "No Good." This term is used on shot records e.g. N.G. Sound, N.G. Action, etc.

NIGHT FILTER

An optical filter which attenuates those parts of the spectrum which are predominant constituents of daylight, i.e. the blue from the sky and the green reflected from trees and grass. Night filters are consequently red, and are used to produce night effects by day on black-and-white film. They require a large filter factor to compensate for the amount of light they absorb. Night filters are a type of effects filter.

NOISE

1. Any extraneous sound tending to interfere with the proper and easy perception of those sounds which it is desired to receive. 2. Any undesired sound.

NON-THEATRICAL

A term applied to the showing of films outside commercial movie theaters, and to film intended for such showing.

NOTCH

A recess on the edge of a piece of film to be duplicated in a printer. The notch automatically triggers a mechanism effecting some modification of the duplication process, commonly a change of exposure light intensity, through a diaphragm control.

ONE-LIGHT WORKPRINT

An editing copy of the original film which is printed with no scene to scene light correction.

OPTICAL PRINTER

Any printer in which an image-forming optical system lies between the film bearing the image to be transferred and the film onto which the image is to be printed. May be either a step printer or a continuous printer. The arrangement is versatile, in that alterations of image may be introduced to produce optical effects or enlargement or reduction of image size.

ORIGINAL

An initial photographic image, or sound recording - whether photographic, magnetic, or on disc - as opposed to some stage of duplication thereof. Cumulative degradation in duplication and reduplication sets the original apart as a prime source of reference in judging fidelity of a reproduction.

OUTLINE

An early treatment of the idea of a film in which the film maker's intended approach to his subject is roughly sketched.

OUT-TAKES

Rejected shots or takes of a single shot which do not find a place in the completed version of the film.

OVEREXPOSURE

An exposure greater than the optimum for a particular photographic emulsion, developing condition, and range of object brightness.

OVERLAPPING ACTION

Any action or sound appearing in more than one shot, as photographed, to

permit matched action cutting.

PACING

The rate (tempo) or periodicty (rhythm) of development of theme in a film presentation.

PAN (PANNING)

Movement of the camera by pivoting in a horizontal plane. Sometimes the term is used generally to describe movements of the camera in any plane.

PARALLAX

The difference between the image seen by the eye through the view-finder and that seen by the camera lens. In framing a picture, this has to be taken into consideration, since areas may be cut off due to this error. Parallax is eliminated in cameras with reflex viewing systems, since the eye sees through the camera lens itself. See Viewfinder.

PARALLEL ACTION

Alternate scenes of actions supposed to be taking place at the same time.

PERFORATIONS, FILM

Film perforations are the regularly and accurately spaced holes that are punched throughout the length of motion picture film. These holes are engaged by the teeth of various sprockets and pins by which the film is propelled and positioned as it travels through cameras, processing machines, projectors, and other film machinery.

PHOTOFLOOD

Trade name for a brand of incandescent lamp (and, loosely, for all lamps of this class) in which the filament characteristics have been adjusted in manufacture to produce more than normal light output when the lamp is used at normal voltage. To achieve this the life of the lamp is materially reduced.

POSITIVE (PRINT)   (SEE ALSO POSITIVE IMAGE)

The term POSITIVE or PRINT is used to designate any of the following:
(a)   the raw stock specifically designed for positive images;
(b)   the positive image;
(c)   positive raw stock which has been exposed, but has not been processed;
(d)   film bearing a positive image which has been processed.

POSITIVE IMAGE

A photographic replica in which the values of light and shade of the original photographed subject are represented in their natural order.

In the case of color film, the positive image also represents each color of the original photographed subject in the natural order tonal range as it appears in the subject.

POST RECORDING

Recording to match sound to picture after photography has been completed. "Voice-over" narration is the most familiar example.

POSTSYNCHRONIZATION

The addition of speech or sound effects to synchronize with picture images which have already been shot. See also DUBBING.

PRE-RECORDED

Recording of sound tracks prior to animation.

PRINTER

A device for carrying out the process of printing. Film printers can be classified according to one or more of the following types: contact printer, continuous printer, optical printer, step printer.

PRINTING

Printing is the process of exposing raw stock by using the image of an-other film as the light modulator. Through printing, one may produce a positive print from a negative film; a negative film from a positive film; or, if the reversal process is employed, printing may be used to produce positives from positives or negatives from negatives. When the verb "to print" is used, any of the above processes may be implied.

PROCESSING

The group of operations comprising the developing, fixing, hardening, washing and drying of film, and with any other processes required to produce a negative or positive with a satisfactory visible image from a strip of film carrying a corresponding latent image.

PRODUCER

The person who carries ultimate responsibility for the original shaping and final outcome of a film. The entrepreneur who initiates and manages film production activities.

PRODUCTION

The general term used to describe the processes involved in making all the original material that is the basis for the finished motion picture.

PRODUCTION UNIT

A self-contained group consisting of director, camera crew, sound crew, electricians, etc. which works on a sound stage or or location to shoot an assigned picture or section of a picture.

PROJECTION SYNCHRONISM

The time relation between picture and corresponding sound in a projection print. Correct projection synchronism is indicated by exact coincidence of picture and sound as seen and heard. To attain this result, it is necessary to place the sound track ahead of the center of the corresponding picture (26 frames for 16mm film).

PROPS

Short for "properties." In theatrical and motion picture work a property is any article necessary for the effective staging of a play. Often used to mean an imitation or fake, as prop jewelry or prop vase because imitations often show as well as, or better than, the more expensive genuine article on the stage.

PROTECTION COPY

A recording of sound and picture held in storage until after the production or program is completed. Protection copies of a film are often stored in a different laboratory from the one in which the originals are being stored.

PUSH-OVER WIPE

A type of wipe in which the first image moves horizontally across the screen, as if propelled by the second image which immediately follows it, much as in a lantern slide projector when slides are being changed.

RAW STOCK

Unexposed motion picture film.

READER (SOUND)

A device used on the editing bench to listen to sound tracks either magnetic or optical. It is used for the quick convenient locating of sound elements and not for quality judgments of the track fidelity.

RECORDING, LIVE

A recording of an original sound, as distinguished from re-recording. Also called an original recording.

REDUCTION PRINTING

Reducing by optical projection and re-photographing on a device called

a reduction printer from 35mm to 16mm, or from 16mm to 8mm.

REFLECTED LIGHT

When light from an external source strikes an object, the fraction of
incident light which is not absorbed by the object may behave in either
of two ways: If the object has a bright, smooth surface, the light may
be reflected specularly, with angles of incidence and reflection equal
(regular reflection); but if the surface of the object is rough, or
"matte," reflection will be diffuse, with an infinite number of angles
of reflection for a given angle of incidence (diffuse reflection).

REFLECTOR

A reflecting surface, generally silver in color, which is used to re-
flect light where it is needed. For exteriors reflectors are often used
to direct sunlight onto the actors or some other part of the scene. For
interior lighting, reflectors are incorporated in lamps to reflect light
coming from the back of the bulb.

RELEASE

To place a motion picture upon the market. To declare a film open to book-
ings. Also used as a noun, a picture offered for bookings.

RELEASE PRINT

A composite print made for general distribution after the final trial com-
posite or answer print has been approved. It is in projection synchronism.

RE-RECORDING

1. The electrical process of transferring sound records from one or more
films or discs to other films or discs. 2. Specifically the combining of
all tracks (sound effects, dialogue, music, etc.) onto one final track.
Also known as mixing.

RETAKE

A scene which must be re-photographed because of any technical or creative
difficulty.

REVERBERATION

Multiple or repeated reflection of sound, perceptible in considerable
volume and for a considerable duration before attenuation by absorption.
Also, any acoustical or electrical simulation of this process.

REVERSAL FILM

A reversal film is one which after exposure is processed to produce a
positive image on the same film rather than the customary negative image.

If exposure is made by printing from a negative, a negative image is produced directly. Reversal films may be black and white, or color, and either sound or picture or both, and they are usually 16mm films. This positive image is not the same as a print from a negative inasmuch as right and left appear transposed because of the difference in the emulsion position.

REWIND

1. A hand-cranked or motor driven spindle on which film reels may be mounted and rotated rapidly. Used in pairs, mainly in cutting and projection rooms, to transfer film from one reel to another. 2. The act of transferring film from reel to reel by means of a pair of rewinds.

ROLL TITLE (CRAWLING TITLE)

A title that appears to move from the bottom to top of the screen.

ROUGH CUT

A preliminary, trial stage in the process of editing a film. Shots, scenes, sequences, are laid out in approximate relationship, without detailed attention to the individual cutting points. The version of the work print of a film which follows next after the assembly in the film's progress toward completion.

RUSHES.

Prints rushed through the laboratory, usually the day after the original has been exposed. Rushes may be picture, sound or composite. Also called DAILIES.

SCENE

A single development of a sequence. All the action in one setting taken without stopping the camera. A scene broken by any form of insert is "continued," technically unbroken, after the interruption. See also "shot."

SCORING (MUSIC)

The process of recording music to fit the action.

SCRIM

A translucent device placed in front of a light for purposes of light control, e.g., a flag made of translucent material. Its effect is partly to cut off, partly to diffuse the source of light near which it is placed; it is thus midway between a gobo and a diffuser.

SCRIPT

A set of written specifications for the production of a motion picture.

a reduction printer from 35mm to 16mm, or from 16mm to 8mm.

REFLECTED LIGHT

When light from an external source strikes an object, the fraction of
incident light which is not absorbed by the object may behave in either
of two ways: If the object has a bright, smooth surface, the light may
be reflected specular, with angle of incidence and reflection equal
(regular reflection); but if the surface of the object is rough, or
"matte," reflection is diffuse, with an infinite number of angles
of reflection for a given angle of incidence (diffuse reflection).

REFLECTOR

A reflecting surface, usually silver in color, which is used to re-
flect light where it is needed. For exteriors reflectors are often used
to direct sunlight onto actors or some other part of the scene. For
interior lighting, reflectors are incorporated in lamps to reflect light
coming from the source of the light.

RELEASE

To place a motion picture upon the market. To declare a film open to book-
ings. Also used as a noun, a picture offered for bookings.

RELEASE PRINT

A composite print made for general distribution after the final trial com-
posite or answer print has been approved. It is in projection synchronism.

RE-RECORDING

1. The electrical process of transferring sound records from one or more
films or discs to other films or discs. 2. Specifically the combining of
all tracks (sound effects, dialogue, music, etc.) onto one final track.
Also known as mixing.

RETAKE ·

A scene which must be re-photographed because of any technical or creative
difficulty.

REVERBERATION

Multiple or repeated reflection of sound, perceptible in considerable
volume and for a considerable duration before attenuation by absorption.
Also, any acoustical or electrical simulation of this process.

REVERSAL FILM

A reversal film is one which after exposure is processed to produce a
positive image on the same film rather than the customary negative image.

If exposure is made by printing from a negative, a negative image is produced directly. Reversal films may be black and white, or color, and either sound or picture or both, and they are usually 16mm films. This positive image is not the same as a print from a negative inasmuch as right and left appear transposed because of the difference in the emulsion position.

REWIND

1. A hand-cranked or motor driven spindle on which film reels may be mounted and rotated rapidly. Used in pairs, mainly in cutting and projection rooms, to transfer film from one reel to another. 2. The act of transferring film from reel to reel by means of a pair of rewinds.

ROLL TITLE (CRAWLING TITLE)

A title that appears to move from the bottom to top of the screen.

ROUGH CUT

A preliminary, trial stage in the process of editing a film. Shots, scenes, sequences, are laid out in approximate relationship, without detailed attention to the individual cutting points. The version of the work print of a film which follows next after the assembly in the film's progress toward completion.

RUSHES

Prints rushed through the laboratory, usually the day after the original has been exposed. Rushes may be picture, sound or composite. Also called DAILIES.

SCENE

A single development of a sequence. All the action in one setting taken without stopping the camera. A scene broken by any form of insert is "continued," technically unbroken, after the interruption. See also "shot."

SCORING (MUSIC)

The process of recording music to fit the action.

SCRIM

A translucent device placed in front of a light for purposes of light control, e.g., a flag made of translucent material. Its effect is partly to cut off, partly to diffuse the source of light near which it is placed; it is thus midway between a gobo and a diffuser.

SCRIPT

A set of written specifications for the production of a motion picture.

See also, "Outline," "Treatment," and "Shooting Script."

SCRIPT BREAKDOWN

See Breakdown, Script.

SCRIPT CLERK

A person who keeps notes on the details of action, dialogue, sets and locations, by scene and take, as shooting of a film progresses.

SEGUE

To manipulate gain control in such a way that, as one constituent sound decreases another increases. The total output of sound is thus kept constant. Also known as "Cross Fade."

SEQUENCE

An episodic portion of a film characterized by inherent unity.

SET

An artificial construction which forms the scene of a motion picture shot or series of shots.

SET DRESSING

Arrangement of properties and furnishings within the action field.

SHARPNESS (IMAGE)

Applied to photographic emulsions, sharpness of image means the ability to render accurately sharp boundaries between opaque and transparent areas. This property is related to resolving power, but is by no means identical with it.

SHOOTING BREAKDOWN OR SHOT BREAKDOWN

Organization of script scenes in the order they are to be photographed.

SHOOTING SCHEDULE

A schedule of the order of shooting, generally arranged by days and including particular scenes to be shot.

SHOOTING SCRIPT

The final working script of a film which details the shots one by one in relation to their accompanying dialogue or other sound.

SHOT

Any unit of uninterrupted pictorial action, resulting from a single run of

the camera. In commercial practice, a shot is more often called a scene, especially in referring to the script. The common descriptions of shots are necessarily relative to the kind of picture of which they form part:

CLOSE SHOT (CLOSE-UP)

A shot taken with the camera close, or apparently close, to the subject, which is often a human face filling the field. Abbreviated CS or CU.

DOLLY SHOT

A shot in which the camera moves bodily from one place to another on a special camera support such as a dolly or boom. Also called TRUCKING or TRACKING shot.

ESTABLISHING SHOT

Long shots, usually in exteriors, which establish the whereabouts of the scene.

HIGH SHOT

A shot which looks down on the subject from a height.

INSERT SHOT

A shot of some object, usually a piece of printed matter, which is cut into a sequence to help explain the action.

LONG SHOT

A shot in which the object of principal interest is, or appears to be, far removed from the camera. Abbreviated LS.

LOW SHOT

A shot which looks up at the subject, often from ground level.

MEDIUM CLOSE SHOT

A shot intermediate in distance between a close shot and a medium shot. Abbreviated MCS.

MEDIUM LONG SHOT

A shot intermediate in distance between a medium shot and a long shot. Abbreviated MLS.

MEDIUM SHOT (MID SHOT)

A shot which shows a person at full height, or views a scene at

normal viewing distance. Abbreviated MS.

MOVING SHOT

A shot from some normally moving object such as an airplane or an automobile.

PAN SHOT

A shot in which the camera sweeps across the scene by pivoting in a horizontal plane.

REACTION SHOT

A shot inserted in a dialogue sequence to show the effect of an actor's words on other participants in the scene, usually in close-up. More generally, any shot displaying the reaction of anything.

TWO SHOT

A shot cantaining two characters, as a rule close to the camera. The term THREE SHOT has a corresponding meaning.

ZOOM SHOT

Apparent motion of camera toward (or away from) subject as shot progresses. Achieved either through rapid motion of the camera, or with a zoom lens.

SINGLE SYSTEM SOUND RECORDING

A method of sound recording in which the sound is originally recorded on the same strip of film as the picture image. Owing to difficulties in cutting caused by the difference between camera and editorial synchronism, and to sensitometric disadvantages, single-system sound has been almost wholly abandoned in favor of double-system sound recording, except for newsreels.

SKIP FRAME

An optical effect in which every other frame is printed in order to speed up the action of the shot.

SLATE BOARD

A board placed in front of the camera at the beginning or end of each take of each scene, which identifies the scene and the take and gives the name of the picture, the director, and the cameraman. See also CLAPPER BOARD.

SLOW MOTION

At standard projection rate, any action which takes place on the screen

at a rate less rapid than the rate of the real action which took place
before the camera. This occurs when the camera is operated at a frame
repetition rate greater than standard, but the projection frame repeti-
tion rate is maintained at standard.

SLUG

A piece of leader inserted in a picture or sound work print to replace
damaged or missing footage.

SOUND CAMERA

1. A camera designed for sound shooting (i.e. picture and concurrent
sound), and therefore silenced so as not to emit camera noise. A
special housing called a "blimp," "bungalow," or "barney" is used to
muffle or diminish the camer's sound.
2. A camera in which the sound is recorded on film.

SOUND EFFECTS

Any sound from any source other than the tracks bearing synchronized
dialogue, narration, or music, commonly introduced into a master track
in the re-recording step, usually with the idea of enhancing illusion
of reality in the finished presentation.

SOUND EFFECTS LIBRARY

An indexed collection of discs and/or magnetic tapes bearing commonly
used sound effects which may be required for sound effects cutting.

SOUND HEAD

The section of a projector, dubber, or other film reproducer which con-
tains the constant-speed film propulsion mechanism, the exciter lamp and
phototube. The term is also applied to the sound-printing head of a
printer.

SOUND IMAGE

A sound image is a photographically obtained sound track or sound record.
Also known as "optical sound."

SOUND TRACK

A narrow band, along one side of a sound film, which carries the sound
record. In some cases, several such bands may be used, such as in stereo-
phonic recording, and sometimes for foreign release, where the music and
effects will be kept, but the voices dubbed.

SPECIAL EFFECTS

Any shot unobtainable by ordinary straightforward motion picture shoot-

ing techniques. In this category fall shots requiring contour matting, multiple image montages, split screens, vignetting, models, and the like.

SPEED

The correct speed at which a film mechanism is designed to run. The cry "Speed!" means that a sound or picture camera has reacned synchronous speed. It is the signal for the director to call "Action!"

SPLICE

The joining together of two pieces of film with film cement or tape. Also the joint itself. Splices are of two kinds, BUT SPLICES, where the ends of the film abut and LAP SPLICE, where the film ends overlap.

SPLICER

A maching for effecting the operations needed to splice two lengths of film together.

SPLIT REELS

Standard reels having one removable side, so that a core may be mounted on the spindle and wound film taken off at will and transferred to a flange or a can without having to undergo rewinding.

SPOT

Short for spotlight, a lighting unit which projects a concentrated spot of light. Much like the spotlight used on the stage.

SPROCKET

A wheel carrying regularly spaced teeth of the correct pitch and separation to engage with film perforations and to propel the film through various types of mechanism while maintaining proper synchronism, and, where necessary, registration.

STAGE

The floor of a studio on which shooting takes place is called a stage, or sound stage when used for sound shooting.

START MARKS

A sync mark on one or more film tracks designating the point from which an operation such as printing, projection or synchronizing is to begin. Academy leaders incorporate two start marks, one for picture and one for sound.

STEP PRINTER

A film printing device arranged to print motion picture film one frame at a time, either by contact or projection.

STOCK FOOTAGE

The material in a film library which consists of shots, such as establishing shots, historical material, and footage of other general application, which is likely to be used on many productions over a period of time.

STOP DOWN

To decrease the diameter of the light-admitting orifice of a lens by adjustment of an iris diaphragm.

STOP MOTION

Making a motion picture one frame at a time. Used on natural objects it gives the appearance of impossibly swift, jerky motion and is often used for comedy effects. It is also used in animated work where the figures which are to simulate motion are moved slightly between each exposure.

STOP MOTION PRINTING

Repeated printing of a specific frame for the purpose of holding it on the screen for detailed examination.

STORY BOARD

A pictorial outline of a film presentation, based on sketches or photographs of representative situations, and designed to accompany a draft of a script as an aid in visualizing the ideas involved.

STRIKE

To dismantle and store props and sets on completion of a production (carryover from stage parlance). Also, to print a film (analogy from typographical cant).

STUDIO CAMERA

See Camera, Motion Picture-Types.

SUBJECTIVE CAMERA

A situation in which the camer's point of view simulates that of a person participating in the scene. In "how-to-do'it" films, for example, it is common practice to place the camera so as to simulate the operator's point of view.

SUPERIMPOSE

Photographing or printing one image over another, such as a title over a background.

SWISH PAN

A type of panning shot in which the camera is swung very rapidly on its

vertical axis, the resulting film producing a blurred sensation when viewed, which is quite unlike that produced by a corresponding movement of the eye.

SYNCHRONIZATION

The matching of sound track to picture so that sound exactly coincides with picture action; the relation between picture and sound films with respect either to the physical location on the film or films, or to the time at which corresponding picture and sound are seen and heard. Often referred to as "sync."

SYNCHRONIZER (SYNC BLOCK)

A device used in the cutting room for maintaining synchronism between film tracks. It consists of two or more sprokets rigidly mounted on a revolving shaft. The tracks are placed on the sprokets and accurately positioned by their perforations, so that they can be wound along by rewinds while maintaining a proper synchronous relationship.

SYNCHRONOUS MOTOR

A type of alternating current electric motor in which the rotation of the armature is automatically locked to the frequency of the power supply, which in central generating stations is in turn determined by a clock motion of a very high order of accuracy. For most practical purposes, including film drive, a synchronous motor insures constant speed.

SYNOPSIS

1. A short or preliminary version of the script of a film. 2. A summary of a completed film, often intended to catalogue its contents for a film library.

TAIL

The finish of a film. Film wound with the finish end on the outside of the roll is designated as "Tails-out."

TAIL LEADER

Protection leader spliced to the last frame of the reel or roll of film. Used to protect the body of the film as it runs out of the gate of the projector or moviola.

TAIL SYNC

Punch or mark in the tail leader of "A" roll, "B" roll, magnetic or optical track, and edited work print. Used to check if rolls have remained in sync during track cutting, conforming, or re-editing.

TAKE

Any uninterrupted recording of picture and/or sound, usually numbered sequentially and identified in picture by slate and in track by voice.

TELEPHOTO LENS

By strict definition, a lens, usually of greater than normal focal
length, so constructed that the back focus is different from the ef-
fective focal length of the lens; usually less, in order to increase
compactness, sometimes more, in order to allow for the use of a wide
angle lens in a camera where a prism must be interposed between lens
and film See LENS, LONG FOCUS.

TELEVISION CROPPING (TV CUTOFF)

Reduction of the action field in television transmission and reception.

TILT

Pivotal camera movement in elevation as a shot proceeds.

TITLE

1. Name by which the play is called and known. 2. Printed captions
in motion picture film. This term includes credit titles, end titles,
main titles, and subtitles.

TITLE, WORKING

Tentative title which is used to designate the picture while it is in
production.

T-NUMBER (see T-STOP)

TRACKING (see DOLLYING)

TRACK LAYING

Editing of the sound to the picture.

TRACKS

The bands of re-recorded magnetic sound film used to mix sound for a
film. Separate bands carry music, effects, narration and dialogue,
and may be referred to as the "music track," the "effects track," etc.
The final mixed band of sound, magnetic or optical, may be referred to
simply as "the track."

TRAILER

Short film for advertising purposes. Containing a brief part of the
story, it is usually known as "previews of coming attractions."

TRANSITION

The passage from one episodic part to another. Ideally, film transitions
should be accomplished rapidly and smoothly, without loss of audience
orientation, and they should be consistent with the established mood of
the film. In attempting to satisfy these requirements, film makers have

devised numerous techniques for smoothing out transitions and making
them instantly comprehensible to the audience. Optical effects are
widely used to reduce or eliminate the impact of sudden visual dis-
continuity. Music can be managed in a similar way. Anticipatory cues
in dialogue or narration may be spotted juduciously to prepare the au-
dience for a transition to come.

TREATMENT

A more or less detailed preparation of a story and idea in film form
but written in non-technical language.

TRIMS

Unused remnants cut from shots used in a film.

TRIPOD

A simple type of three-legged support, often used to hold field cameras.

TRUCKING (seeDOLLYING)

T-STOP

A number used in calibrating lenses by a uniform system which takes vari-
ations of optical efficiency into account. Calibrated by this system,
any lens set to a specific t-stop should produce the same central-image
illumination, for a given scene, as any other lens so calibrated and set.
See also "f-stop."

TURRETT

A rotary plate mounted on the front of a camera and provided with accom-
modations for two or more lenses, any of which may be moved rapidly into
position for photography.

UNDEREXPOSURE

An exposure less than the optimum for a particular photographic emulsion.

UNEXPOSED

Film which has not undergone an exposure is called unexposed.

UNIT MANAGER

The person in business control of a production unit on location.

VARIABLE-AREA SOUND TRACK

A variable-area track is a sound track divided laterally into opaque
and transparent areas, a sharp line of demarcation between these areas
forming an oscillographic trace of the wave shape of the recorded sig-
nal. This is the industry-wide accepted sound track in current prac-
tice.

VARIABLE-DENSITY SOUND TRACK

A method of sound recording on film in which the sound is re-recorded as a number of density gradations perpendicular to the edge of the sound track, and extending across its full width. The distance between gradations is determined by the recorded frequency, and the difference in density between the lines and the spaces between the lines is determined by the signal amplitude. The gradations are often referred to as striations.

VAULT

A strong room or safe used for the storage of film, generally cool, dry, and fire-resistant.

VELOCILATOR

A movable camera mount intermediate in size between a dolly and a boom. It will carry a heavy camera up to a height of about six feet, but it is not intended to be raised or lowered rapidly while the camera is runing. The movement is usually hand operated.

VIEWFINDER

An optical device forming part of a camera or attached to it, which provides an image (usually magnified) approximating that which is formed by the lens on the film.

DIRECT VIEWFINDER

This type, which usually incorporates a focusing microscope, enables the cameraman to scrutinize the image which the lens will actually form on the film. It requires no correction for parallax, as it is "racked over" into the taking lens position for use with the camera stopped. Parallax is introduced, however, when the camera is racked back into the operating position.

MONITORING VIEWFINDER

A finder external to the camera and often to the blimp, which enable the cameraman to watch his scene while the camera is turning. It is usually equipped with accurate compensation for parallax, and in some designs gearing is provided to couple the finder to the lens-focusing mount.

REFLEX VIEWFINDER

A type of direct viewfinder which sees through the lens while the picture is being taken. It is constructed by means of a silvered mirror on the back of the shutter which allows a continuous image to be formed for the eye (while the same is happening to the film) through persistence of vision. The brightness, naturally, varies with the lens aperture.

VOICE-OVER

A sound and picture relationship in which a narrator's voice accompanies picture action.

WAXING

The application of wax to the edges of film which is to be projected in order to prevent chattering and consequent piling up of the emulsion, especially when the film has been improperly dried.

WIDE ANGLE LENS

1. Lens of short focus which takes in a wide field of view. 2. In 16mm work, any lens of less than normal (25mm) focal length.

WILD

Any device or process not susceptible to precise control. Variable-speed motors are termed "wild" since control of their speed is not sufficiently accurate for synchronous picture and sound recording work. In a similar sense, either picture or sound, shot without synchronous relationship to the other.

"WILD" RECORDING

Any sound recording which is not made synchronously with a picture record is called a "wild" recording. Sound effects and random voices are usually recorded "wild," narration and music sometimes so. Also called non-sync.

WIPE

An optical effect between two succeeding shots on the screen in which the second shot appears and wipes the first off the screen along a visible line, which may run from top to bottom, side to side, or in any one of a large number of patterns.

WORK PRINT

A print, from the original picture, used for editing. When the work print and sound tracks have been edited to a satisfactory "fine cut," the original is conformed to the work print. See CONFORMING.

WOW

A periodic disturbance in sound. Usually caused by regular variations in angular velocity of some mechanical component of the system. See also FLUTTER (SOUND).

YELLOW LEADER

Exposed and underveloped positive film stock which is used by the editor to make sync leaders, and leaders, and sometimes to take the place of un-modulated leader.

ZOOM, ZOOMING

Real or apparent rapid motion of the camera toward its object is known
as zooming.

ZOOM LENS

A lens of variable focal length, with a continuous range from wide-angle
to telephoto. "Zooming," or changing focal length, can simulate trucking
or dollying, since the subject appears to get closer or move farther from
the camera. More important, the cameraman can easily select the focal
length he desires, without having to remove and replace various lenses of
fixed focal lengths. (See LENS, LONG FOCUS, NORMAL AND SHORT FOCUS).

Protocol developers share a common goal. They are vitally con-
cerned about making the education of teachers less abstract by vividly
displaying important concepts in real life situations. In many cases
the concepts selected to be produced are difficult to teach using tra-
ditional approaches. Through the innovation of protocol materials,
concept acquisition is designed to be taught through capturing real in-
stances of the attributes of the concept. The successful development,
distribution, and use of such protocol materials can significantly af-
fect teacher education in the United States.

In addition to this common goal, protocol developers also share a
common identity as participants in a new and relatively untested field
for instructional materials. As the initial explorers of this field,
protocol developers need to establish criteria for the credibility of
their products. The success of the protocol materials development move-
ment will be measured by others to the degree that its first products
are described with responsibility and accuracy. Protocol developers thus
need to adopt some means of self-regulation in order to protect both pro-
ducers and users. In their use, these materials should be able to meet
the standards of performance as defined by the developers. Such account-
ability can best be achieved if the protocol developers themselves adopt
commonly agreed criteria for their products.

CRITERIA

Selection criteria for instructional materials are of two general
types--technical and educational. Technical criteria relate primarily to
physical considerations--appropriateness of the medium selected, picture and

sound quality, and the facility with which the material can be duplicated
and distributed. Educational criteria relate primarily to the usefulness
of the material and to its effectiveness in helping achieve specified learn-
ing goals. Since the technical and educational considerations are mutually
interdependent when judging the quality of the final product, it is necessary
that both sets of criteria be applied at all stages of materials production.

Because of the differences among the various protocol projects, it
may not be possible to identify criteria that would be appropriate in all
respects for all projects. Neverthless, though the following criteria are
designed to apply to future rather than to current protocol projects, they
should be considered for their relevance to current projects. It may be pos-
sible to set up some minimum standards that would be applicable to most
projects. At the very elast, the following criteria cover a range about which
the protocol developers must reach some consensus.

TECHNICAL CRITERIA

1.   Quality of Sound

      A.   The audio portion of a protocol instructional unit should be judged
            adequate by a consultant or producer experienced in audio productions
            for school use. It should further be judged under normal projection
            conditions; so that, for example, fewer than 10% of the learners
            will report unfavorable perceptions of the sound quality of the
            protocol unit.

      B.   To secure such quality, the protocol developer should use double-
            system sound: recording sound and picture separately.

2.   Visual Quality

      A.   The visual image on the master negative (or original)--and on all
            its reproductions--should have such sharpness of detail that

virtually any viewer, under normal classroom projection conditions, will be able to distinguish critical features of the images presented.

B.   To secure such qualit in film, the protocol producer will employ standard film production techniques for protecting his original foot-age.

He should not use his master original for viewing and editing purposes. He will have an edge-numbered work print made, for example, and use the work print exclusively until the final editing stage when the master original footage is conformed to the work print for printing the first answer print. Once the answer print is approved, a duplicating master should be made from the conformed original for duplication of subsequent prints. Once this supli-cating master is worn out, a new one should be made thus protecting the conformed original from wear and tear.

Original slide and filmstrip materials should receive similar and appropriate protection. The protection process for such materials is simpler than for motion picture film.

3.   <u>Format of Instructional Package</u>

A.   To facilitate distribution, protocol packages should take the form of one, or a combination, of the following media:

(1) 16mm film, or EBR transfer film,

.(2) slides in 35mm or filmstrip, and

(3) cassettes (audio) rather than reel tapes.

B.   In addition each package should provide:

(1) a rationale for its decision to use particular media, and

(2) guides for instructor and students.

C. Guides should provide:

(1) suggestions for ways protocols can be used,

(2) means for participants to record observations,

(3) some means of measuring acquisition of concepts,

(4) some means of relating material to prior learning and

to practical situations.

D. The final form of the instructional package should be such that
it can be readily stored and shipped.

4. Copyright

A. Written releases should be obtained for all materials used in a
protocol. This includes all participants whether appearing on
the screen or rendering services in the production of the material
with the exception of the technical crew on salary or on contract
who shall receive appropriate recognition through credit titles.
Written releases for children appearing in the protocol material
must be secured from their parents. See Attachment A for a repre-
sentative form.

B. Background music, sound effects, songs, lyrics, and other audio
materials used in a protocol should be either original, or written
releases or licenses whould be obtained from their rightful owners.
See Attachments B and C.

There are many music and sound effects libraries which will sell
the non-exclusive rights of their pre-recorded material for a nominal
charge.

C A copyright notice should appear somewhere at the beginning of the
material, including the date and the name of the copyright owner,

for protection of the over.ll design and treatment of the material

and its copyri₀h ₌ᵇ₁: components. Clearance for publication of
materials developed by federally funded projects should be obtained
from the Office of Education. (For further information, write to
The Copyright Administrator, USOE, 400 Maryland Avenue, S.W.,
Washington. D. C. 20202).

EDUCATIONAL CRITERIA

1. Concept Attainment

A. Preferred Standard:

Learners who have completed a protocol instructional unit
dealing with a given concept are able to identify teaching applica-
tions or examples of the concept at or above the 80% accuracy level
under simulated instructional situations. This criterion of perfor-
mance has been attained by at least 80% of the learners who complete
the unit.

B. Alternative Standard:

There is a statistically significant difference in favor of the
performance of groups who have completed the protocol instructional
unit as compared with groups who have studied the concept using a
conventional academic approach as measured under actual classroom
conditions.

2. Learner Reactions

Protocol instructional units should be presented in such a way that the
learner perceives the material to be personally useful. A recommended
standard is:

> After completing a protocol instructional unit,
> fewer than 10% of the learners will report un-
> favorable perceptions of the module.

Specific learner reactions should be obtained on the following aspects of the learning experience:

(1) Interest level of the materials

(2) Perceived relevance to later teaching

(3) Learner desire for additional protocol material experience

(4) "Based on your experience with these materials, would you recommend to other students that they take this training?" (Willingness to recommend protocol material experiences to other students).

Any self-report measure which indicates that the protocol meets or exceeds this level would be acceptable. But data may be more useful if developers could agree on using a single self-report instrument, preferably a balanced, five-point rating scale. Some specific learner reactions to be obtained and a possible format to be followed are illustrated in Attachment D.

3. <u>User Satisfaction</u>

The users of the protocol materials should also report favorable per-ceptions about the effect of the materials under a variety of instructional conditions.

The minimum information should include user perceptions of:

(1) The importance of the concepts covered.

(2) The ease of fitting the protocols into a variety of programs.

(3) The perceived difficulty of the concept to be taught.

ATTACHMENT A

Project_____

R E L E A S E

STATE OF _____)
) ss.
COUNTY OF_____)

I, _____, of the _____

of_____, hereby agree to participate in

the making of educational pictures and sound tracks designed to be

used in the preparation of television shows, moving picture films,

or films commonly known as kinescopes and further consent that such

pictures and tapes may be used for television broadcast, and that

Michigan State University and its Instructional Media Center may

use such pictures, shows, films, kinescopes, sound tracks and tapes

so prepared for exhibition and publication purposes and may grant

the right of educational use to other parties for such purposes,

and in consideration thereof hereby expressly waive any possible

claim on my part for damages or renumeration in any form in con-

nection therewith.

                                    _____

                                    _____
                                    (if minor, parent sign)

                                    (LATE)_____

APPLICATION FOR
RE-RECORDING CLEARANCE LICENSE
for
MAJOR MOOD MUSIC RECORDS

Date

THOMAS J. VALENTINO, INC.   150 West 46 Street   New York, N.Y. 10036

We have recorded the following compositions in synchronism with the motion picture, television or radio show, as listed below, which was produced for:

_____ TV FILM PURPOSES   _____ NON-THEATRICAL FILM PURPOSES

_____ SLIDE FILM   _____ RADIO PURPOSES

_____ RADIO SPOT COMMERCIAL   _____ TELEVISION SPOT COMMERCIAL

_____ VIDEOTAPES   _____ COMMERCIAL RECORDS

Please issue a non-exclusive license to us to cover the use as indicated above. Our check in full payment of the license fee is attached herewith.

SEND LICENSE TO: _____

ADDRESS: _____

CITY: _____ STATE _____ ZONE _____

TITLE OF PRODUCTION: _____

DURATION
OR LENGTH: _____ PRODUCER OR SPONSOR: _____

Catalog No.	TITLE OF COMPOSITION	COMPOSER	No. of Uses (Needle Drops)	License Fee

SPECIAL INSTRUCTIONS: _____

DeWolfe Music Library inc.

LICENSE APPLICATION

25 West 45th Street, New York, N.Y.10036 · (212) 586-6673

date ....

We have recorded the following compositions from the _DeWolfe and Silvester Musical Libraries_ in synchronism with the production as listed below, which was produced for:

_____ NON THEATRICAL FILMS   and/or   _____ TELEVISION FILM (PUBLIC SERVICE, SYNDICATED, ETC.)

_____ SLIDE FILM   _____ TV SPOT COMMERCIAL

_____ AUDIO DISPLAY   _____ RADIO COMMERCIAL

_____ THEATRICAL FILM   _____ THEATRICAL

Please issue a non-exclusive license to us to cover the use as indicated above. Our check in full payment of the license fee is attached herewith. World rights guaranteed.

SEND LICENSE TO ....

ADDRESS ....

CITY .... STATE .... ZIP CODE ....

TITLE OF PRODUCTION·

DURATION OR LENGTH   PRODUCED FOR·

TITLE	CATALOG NUMBER	NUMBER OF USES (Needle Drops)	LICENSE FEE

ATTACHMENT D

		Strongly agree	Agree	No opinion	Disagree	Strongly disagree
1.	I can make use of the concepts presented in my own teaching					
2.	I would recommend that other students take this instruction.					
3.	I would like to take more of this instruction myself.					
4.	The objectives of this protocol segment were clear.					
5.	The materials were attractive and interesting.					
6.	These materials build on my previous knowledge.					
7.	The content was well-organized.					
8.	Important ideas were easily recognized.					
9.	Learnings were clearly presented.					
10.	Repetition of important content was adequate.					
11.	Learning tasks were easy.					
12.	Learning tasks were suited to my level of understanding.					
13.	Visually the protocol was clear.					
14.	The sound track was clearly audible.					
15.	Guide materials were easy to use.					
16.	Work sheets and visual materials were well-integrated.					
17.	I feel the ideas presented were worth learning.					

REFERENCES

II. An Introduction to Protocol and Training Materials
1. Catalog of Educational Motion Pictures (1970). Bloomington, Indiana: Audio-Visual Center, Indiana University, 1970.
2. Smi h, B. Othanel, et al, Teachers for the Real World. Washington, D.C.: American Association of Colleges for Teacher Education, 1969.
3. Smith, B. Othanel. Unpublished Manuscript on Guidelines for Protocol Materials Proposals. Washington, D.C.: Office of Education, 1970.

III. Concepts in Relation to Protocol Materials and Training Materials
1. Broudy, Harry S., "Criteria for the Professional Preparation of Teachers," Journal of Teacher Education, Vol. SVI, Number 4, December 1965.
2. Hanson, Norwood, Patterns of Discovery, Cambridge University Press, London, 1961.
3. Hullfish, H. Gordon and Smith, Philip G., Reflective Thinking: The Method of Education, Dodd, Mead, New York, 1961, Chapter 9.
4. Körner, Stephan, Conceptual Thinking, Dover Publications, New York, 1959, Chapter XVII.
5. Lewis, C.I., An Analysis of Knowledge and Valuation, Open Court, La Salle, Illinois, 1946 (Chapters III, IV, V, VI).
6. Orme, M.E.J., "The Effects of Modeling and Feedback Variables on the Acquisition of a Complex Teaching Strategy," Harvard University, 1967.
7. Smith, B. Othanel (in collaboration with Coehn and Pearl), Teachers for the Real World, American Association of Colleges for Teacher Education, Washington, D.C. 1969.
8. Vygotsky, L.S., Thought and Language, M.I.T. Press, Cambridge, Mass., 1962.

IV. The Master Plan for the Development of Protocol Materials
1. Tykociner, Joseph T. Outline of Zetetics. Philadelphia: Dorrance and Company, 1966.
Protocol Materials in Teacher Education
1. Kooi, Beverly and Schultz, Richard, "A Factor Analysis of Classroom Disturbance Intercorrelations", American Educational Research Journal 2: 37-40, January, 1965.
2. Ibid.
3. McDonald, Frederick J., "A Concept of Heuristics", Research in Teacher Education, edited by B. Othanel Smith, 73-81.
4. Shulman, Lee S. and Keislar, Evan R., editors. Learning by Discovery: A Critical Appraisal. Chicago: Rand McNally and Company, 1966.
Conceptual Issues in the Development of Protocols
1. Ausubel, David P., Educational Psychology: A Cognitive View. New York: Holt, Rinehart, and Winston, 1968.

Continued:

2. Bellack, Arno A. et al, <u>The Language of the Classroom.</u>
    New York: Teachers College Press, Teachers College,
    Columbia University, 1966.
3. Clark, D. Cecil, Teaching Concepts in the Classroom: A
    Set of Teaching Prescriptions Derived from Experimental
    Research. <u>Journal of Educational Psychology</u>. 1971, 62:
    253-78.
4. Smith, B. Othanel, et al, <u>Strategies of Teaching</u>. Urbana:
    Bureau of Educational Research, University of Illinois, 1967.
Progressive Evaluation of Protocol Development
1. Hudgins, Bryce B., "The Portrayal of Concepts: An Issue in
    the Development of Protocol Materials", <u>Acquiring Teaching</u>
    <u>Competencies: Reports and Studies</u>. National Center for the
    Development of Training Materials in Teacher Education,
    School of Education, Indiana.University. Report #1, Sept. 1972.

ADDITIONAL REFERENCES

For further study the reader may wish to refer to some additional
sources. This list is not meant to be inclusive for there are many fine
references in the field, but rather these suggestions may serve as a
starting point.

1. Ennis, Robert H., <u>Logic in Teaching</u>. Englewood Cliffs, New
    Jersey: Prentice-Hall, Inc., 1969.
2. Gee, James and Berliner, David C., Protocols: A New Diminsion
    in Teacher Education (mimeo). Stanford, California: Far West
    Laboratory for Research and Development, Technical Report.
    December, 1971.
3. Wilson, John, <u>Thinking with Concepts</u>. London: Cambridge Univ-
    ersity Press, 1969.

BIBLIOGRAPHY

Gliessman, David. An Introduction to Protocol and Training Materials,
    Acquiring Teaching Competencies: Reports and Studies. Bloomington,
    Indiana: National Center for the Development of Training Materials
    in Teacher Education, School of Education, Indiana University.
    Report # 1, September, 1972.

Glossary of Basic 16mm. Motion Picture Production Terms. Instructional
    Media Center, Michigan State University, East Lansing, Michigan.
    October, 1971.

Hudgins, Bryce B. The Portrayal of Concepts: An Issue in the Develop-
    ment of Protocol Materials, Acquiring Teaching Competencies: Reports
    and Studies. Bloomington, Indiana: National Center for the
    Development of Training Materials in Teacher Education, School of
    Education, Indiana University. Report # 1, September, 1972.

Orlosky, Donald E. Establishing Criteria for Selecting Protocol
    Materials for Distribution. Unpublished report. March, 1972.

Smith, B. Othanel. The Master Plan for the Development of Protocol
    Materials. U. S. Office of Education, Bureau of Educational
    Personnel Development, Division of College Programs, Protocol
    Materials. Unpublished report. April 8, 1970.

Smith, B. Othanel and Orlosky, Donald E. Protocol Materials in Teacher
    Education. Unpublished report. 1971.

Smith, Philip G. Concepts in Relation to Protocol Materials and
    · Training Materials. Unpublished manuscript prepared for this
    handbook. January, 1973.

Turner, Richard L. Progressive Evaluation of Protocol Materials
    Development. Unpublished report presented at the Protocol
    Production Workshop, Michigan State University, East Lansing,
    Michigan. October, 1971.

Veenendaal, Wilfred. Cues and Miscues to Effective Visualization.
    Unpublished address presented at the Protocol Production
    Workshop, Michigan State University, East Lansing, Michigan.
    October, 1971.